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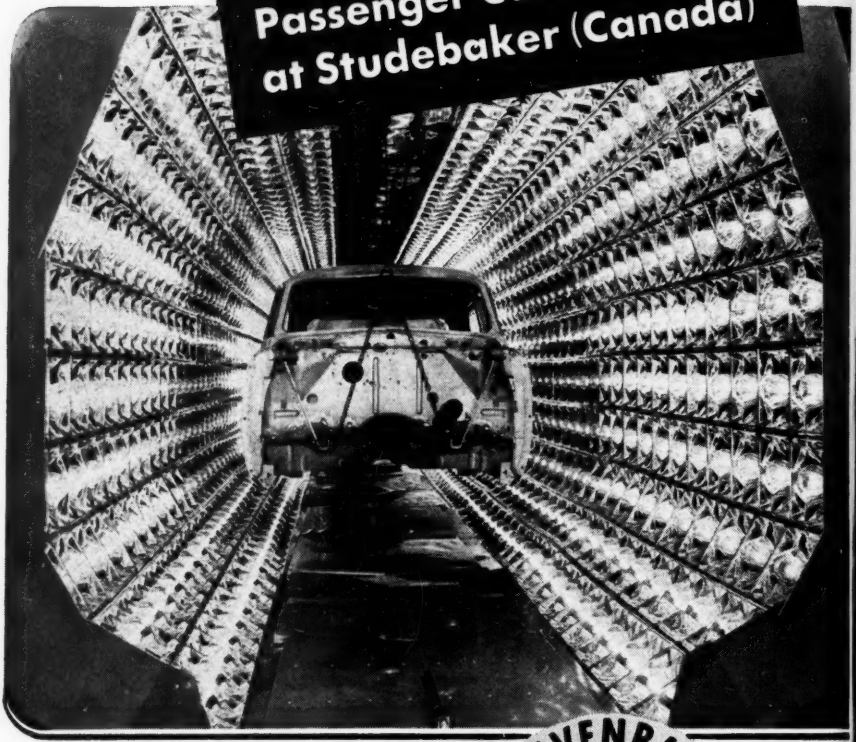

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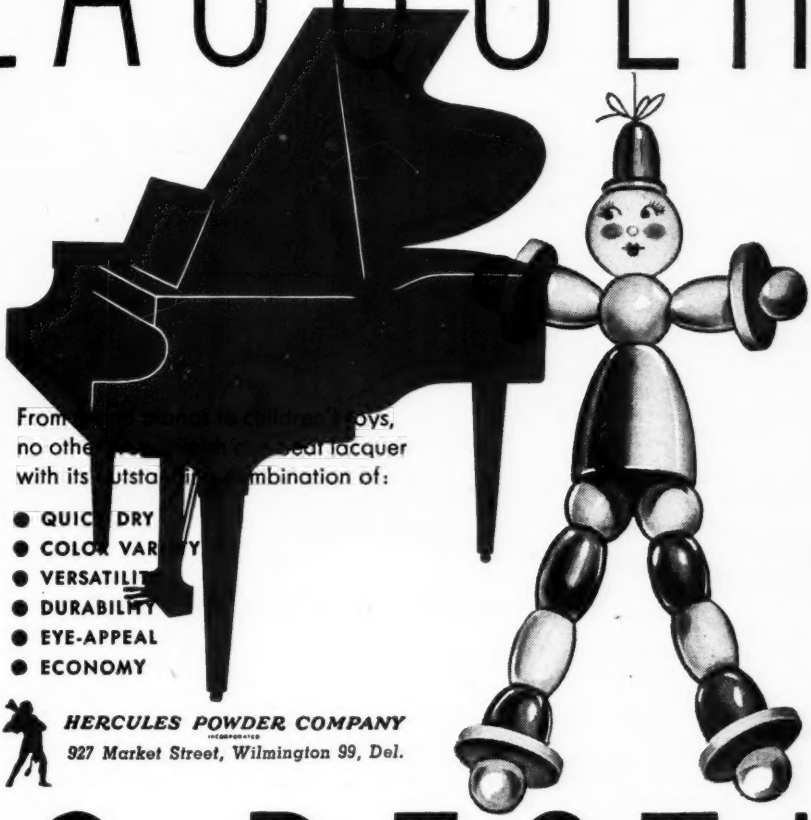

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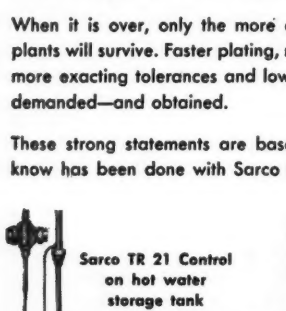
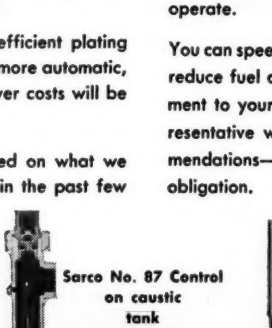
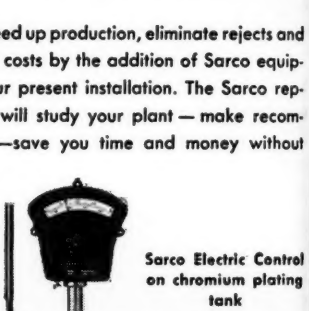


Sarco TR 21 Control on hot water storage tank



Sarco No. 87 Control on caustic tank



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pf editorial

APRIL, 1949

Vol. 13, No. 7

Why Not Standardize Plating Racks?

Recently, a great deal of attention and interest was focused on the agreement between the United States, Great Britain, and Canada on a system of unified screw threads. In addition to this international progress on standardization, a much more comprehensive program to standardize parts used by our Army, Navy, and Air Force has been instituted. This is intended to eliminate duplication and simplify procurement and supply as well as conserve resources.

In the finishing field, the combined efforts of designers, suppliers, and users have resulted in a gradual standardization of major items of finishing equipment. During the past few years a growing realization of the importance of correct plating rack design has resulted in the formation of a number of organizations of specialists in plating rack design and manufacture. Emphasizing this trend is the more recent formation of a number of specialist groups, organized to apply the new plastisol plating rack insulation materials. These developments have raised the status of the plating rack, long regarded as a minor item, from the category of a "supply item" to that of "major equipment."

The improvements made in plating rack design and insulation have given the plater better tools with which to work, and have made possible greater production, fewer rejects, and better quality plating. However, the plating supervisor may have a tendency to forget these benefits when, once a year, he is forced to discard his very considerable investment in plating racks, or at least, to make an additional outlay so that the racks may be modified to fit parts for the new models of cars, household appliances, and other products.

Of course, the expense of modifying plating racks is a minor item as compared with other expenses involved in the production of a new model product of any kind. But to the plater, that expense looms large.

It is quite possible that a cooperative effort on the part of designers, plating rack suppliers, and plating industry technical and trade associations would result in an agreement upon which a degree of rack standardization could eventually be built. Such a program would be of benefit to the entire plating industry.

E. A. Blount

Finishing

THE LUSTRON HOME

PART II

Eleven porcelain enameling plants, in addition to fabricating facilities, under one roof, is a quick way to describe the main plant of the Lustron Corporation, Columbus, Ohio. This article will discuss the various processes which transform a piece of steel into a part for the Lustron Home in the world's largest porcelain enameling plant.

By EZRA A. BLOUNT

PF FEATURE

The idea of using porcelain enamel as a final finish for metal sections to be used for architectural purposes is not new, having been used over the past 15 or 20 years. Porcelain enamel is a type of glass which may be ground very fine and applied to steel sheets so that after processing, it presents a very smooth lasting surface which is easily cleaned and which effectively resists weathering and corrosion. In the past the use of this particular finish has been restricted because, to be successful, the porcelain had to be applied to a special grade of steel called enameling iron and fired at temperatures above 1500 deg. F. Further, to eliminate warping in large architectural shapes and panels, fairly heavy gauges of metal had to be used.

For years the dream of porcelain enamelers has been to develop a porcelain enamel or a method of processing which would make fusing possible at a lower temperature and which would permit the finishing of steel with one coat instead of the conven-

tional two or more. However, not much progress was made in that direction until the end of World War II when research work conducted by porcelain enamel frit manufacturers resulted in the development of an enamel which may be fired at 1300 deg. F. This development made possible the use of cold rolled steel for porcelain enameling since at that comparatively low temperature the steel will not warp or buckle as it will at 1550 or 1600 deg. F. It has long been known that good porcelain enamel practice specified a thin coating of nickel deposited on the enameling iron prior to the application of porcelain enamel in order to promote adhesion of the enamel to the metal and to prevent many of the processing difficulties which would otherwise occur. Concurrently with the development of the 1300 deg. F. enamels, it was determined that proper adherence of porcelain enamel to cold rolled steel could be secured by increasing the deposit of nickel on this metal over that normally used on enameling iron. Mr. E. E. Howe, now manager of Lustron's Ceramic Division, made a major contribution to these developments, as well as to the technique of securing a one-coat finish direct to steel, while he was on the staff of the Chicago Vitreous Enamel Product Co., Cicero, Ill. These two facts—first, the development of 1300 deg. enamels and second, the development of a satisfactory means of applying them to cold rolled steel in a one-coat finish—have, to a large degree, made possible the production of the Lustron Home. This vast housing venture, using as it does large tonnages of steel sheets, could not have been launched in the face of a limited supply of porcelain enameling iron. However, by being able to use a less expensive and more readily available material such as cold rolled steel, the program of producing porcelain enameled steel homes in large volume could be undertaken.

The main building of the Lustron Corporation (1400 feet long and 340 feet wide) houses the world's largest porcelain enameling operation. This is entirely to be expected in view of the fact that Lustron plans a peak annual production of 45,000 homes, each of

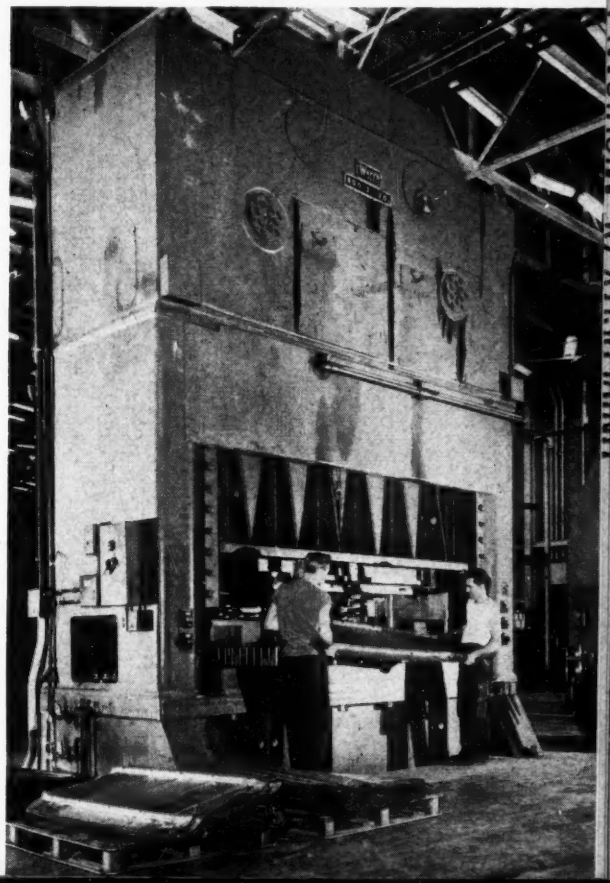
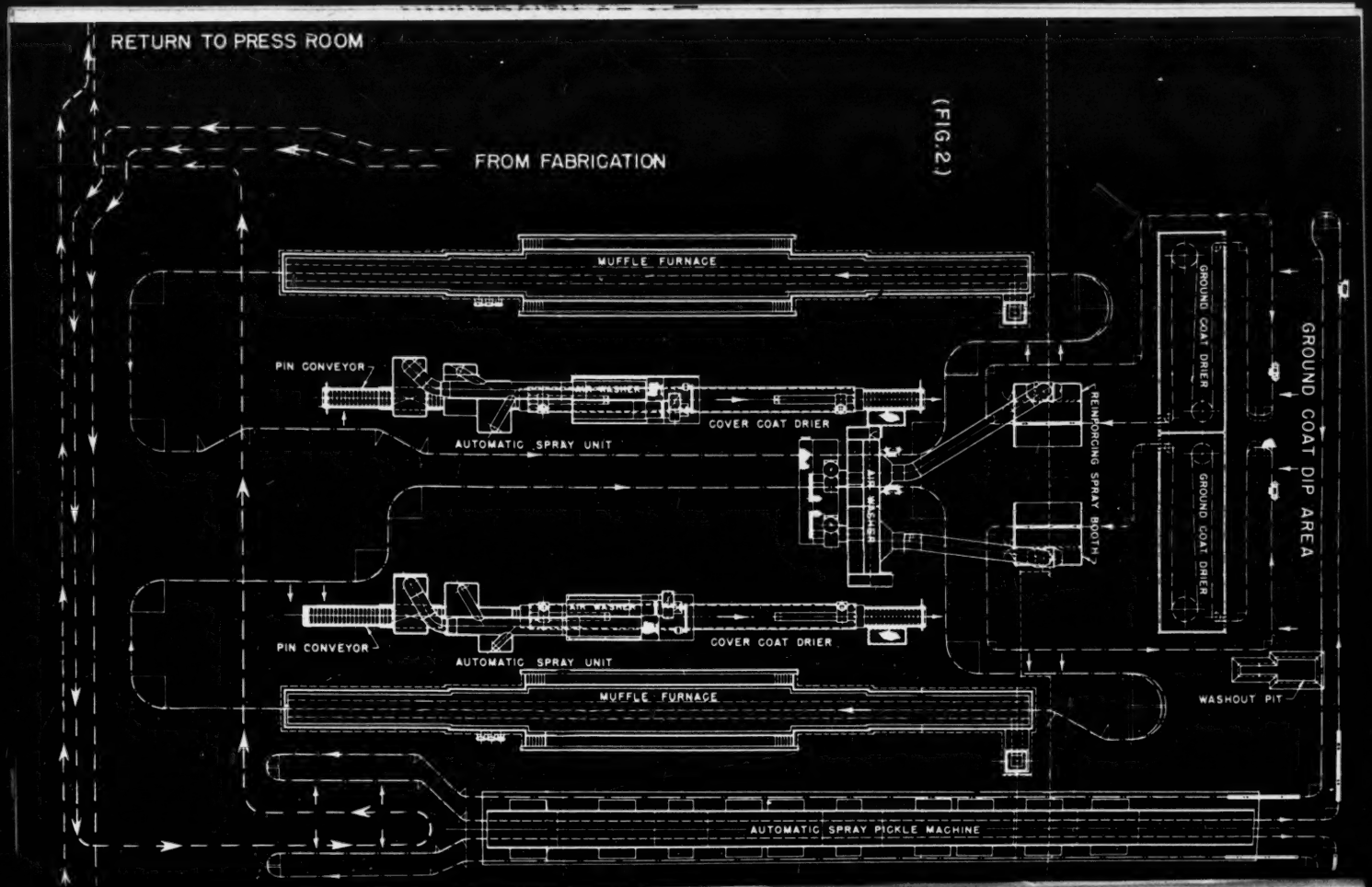


Fig. 1—Each stroke of this 600-ton Warco press transforms a 20-gauge cold rolled steel sheet into a roof panel for a Lustron Home.


RETURN TO PRESS ROOM
FROM FABRICATION
(FIG.2)
MUFFLE FURNACE
PIN CONVEYOR
AIR WASHER
COVER COAT DRIER
AUTOMATIC SPRAY UNIT
REINFORCING SPRAY BOOTH
GROUND COAT DRIER
GROUND COAT DRIER
GROUND COAT DIP AREA
AIR WASHER
PIN CONVEYOR
AIR WASHER
COVER COAT DRIER
AUTOMATIC SPRAY UNIT
MUFFLE FURNACE
WASHOUT PIT
AUTOMATIC SPRAY PICKLE MACHINE

which contains 7600 square feet of porcelain enameled steel. In addition to the equipment comprising the eleven porcelain enameling units, 163 stamping and forming presses, ranging in size from 16 to 1800 tons, have been installed in the main Lustron plant. The 35-foot clearance between the floor and the lowest ceiling beams, in addition to large doors at one end of the building, enables Lustron to receive steel inside the plant so that it can be unloaded from freight cars and trucks in the immediate vicinity of the press or presses which shape it into home parts. Figure 1 is a view of one of the forming presses.

Cleaning and Pickling

Leaving the fabricating department, parts are conveyed by a series of transport conveyors (totaling more than seven miles in length), moving at an average rate of 14 feet per minute, through the various porcelain enameling areas and over to assembly in an adjoining building. It requires 3 hours 57 minutes for a part to travel from the fabricating department through the finishing process to the assembly department. Suspended from Webb monorail chain transport conveyors, parts, loaded in baskets, travel first to one of the two automatic spray pickling machines after being fabricated. Figure 2 is a floor plan of a portion of the enameling department showing some of the conveyor lines and the location of several units which will be discussed in this article. On this diagram an automatic spray pickle machine is located at the extreme right.

Transported to one of the automatic spray pickling machines, the largest ever built for enameling, parts are removed from the transport conveyor baskets and loaded into specially designed stainless steel pickling baskets (see Fig. 3) which resist the corrosive action of the solutions used in the process, and are designed so that parts of various shapes and sizes can be processed most efficiently from a chemical and mechanical standpoint. Usually cleaning and pickling of steel prior to porcelain enameling is performed by submerging the parts in a series of alkali and acid solutions. Problems involved in designing automatic equipment to pickle unusually large parts by the older process led to the development and adoption of the automatic spray pickling process and machine.

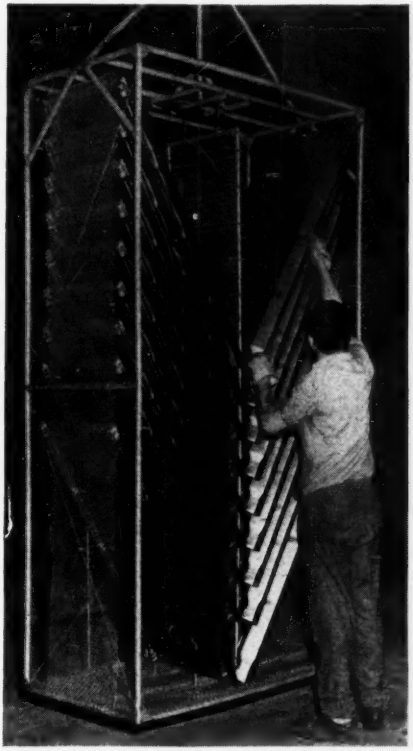


Fig. 3—Roof panels transported to an automatic spray pickling machine are loaded into stainless steel pickling baskets which must be specially designed so that a number of different shaped parts can be processed in the same basket and so that the various solutions will reach all areas and drain properly.

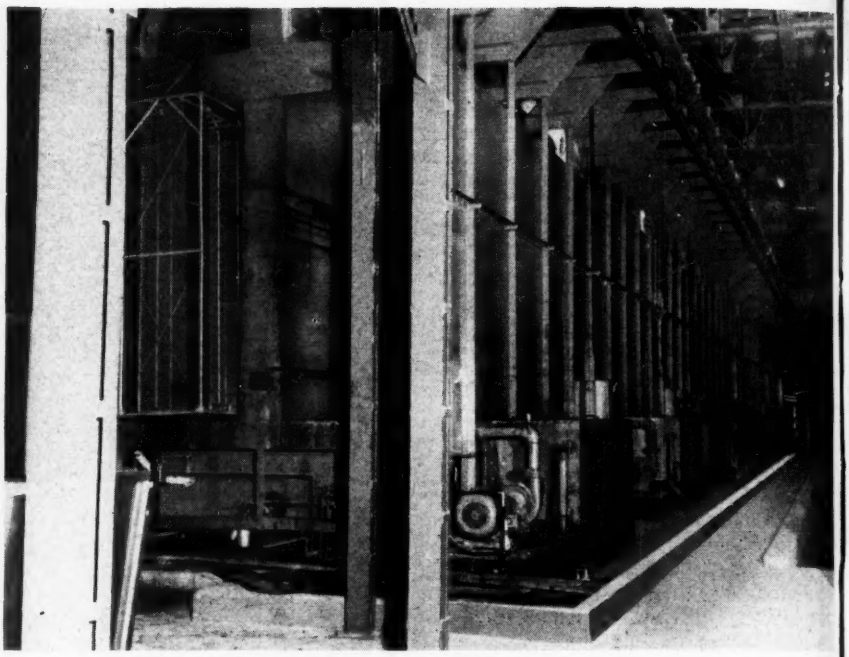


Fig. 4—Illustration shows a basket of parts entering one side of a twin tunnel Metalwash automatic spray pickling machine in which the steel panels are cleaned, pickled, and coated with a thin film of nickel, leaving the exit end of the machine clean, dry, and ready for the ground coat dipping operation. The various solution storage tanks may be seen protruding along the right side of the machine. Motors and pumps for circulating the various solutions through the spray nozzles of the machine are located adjacent to each tank.

Parts stacked in the stainless steel pickling baskets suspended from overhead Link-Belt conveyors enter one of the Metalwash twin tunnel automatic spray pickling machines, a view of which is shown in Fig. 4, and are cleaned and pickled by a series of solutions pressure-sprayed on the parts through a series of nozzles. The processing cycle is as follows:

Treatment	*Temperature (deg. F.)*	*Time (at a conveyor speed of 80 in./min.)*
1. Emulsion cleaner	175-185	1 min.
2. Water rinse	cold	40 sec.
3. Alkali cleaner	175-185	1 min.
4. Water rinse (3-stage)	cold	1 min.
5. Sulfuric acid pickle	145-155	3 min. 15 sec.
6. Water rinse (3-stage)	cold	1 min.
7. Nickel sulfate	165-175	4 min. 40 sec.
8. Cyanide neutralizer	125-135	1 min.
9. Borax neutralizer	125-135	1 min.
10. Hot air dryer	250	4 min.

The use of an emulsion cleaner in the porcelain enamel cleaning cycle is a comparatively recent development, although the possibilities and advantages of the process have been realized for a number of years and, as a matter of fact, were discussed in an article in the January 1938 issue of PRODUCTS FINISHING.[1]

The first cleaning operation per-

[1]Ezra A. Blount, "The Application of Electroplating Practice to Porcelain Enameling," Products Finishing, Jan. 1938. Pp. 14-20.

formed on parts as they enter the 3x9-foot opening of the 188-foot long spray pickling machine consists of an emulsion spray, as noted above. A Wyandotte cleaner is diluted with 35 parts of water to produce this emulsion. Two pumps, connected to a 2700-gallon storage tank, circulate this cleaner continually in each side of the machine at a rate of 1250 gallons per minute through steel pipe and steel orifices or spray nozzles. This section of the all-steel machine is not lined since the emulsion cleaner is not corrosive. A 300-gallon per minute water spray rinse follows the emulsion cleaner. This rinse water discharges directly

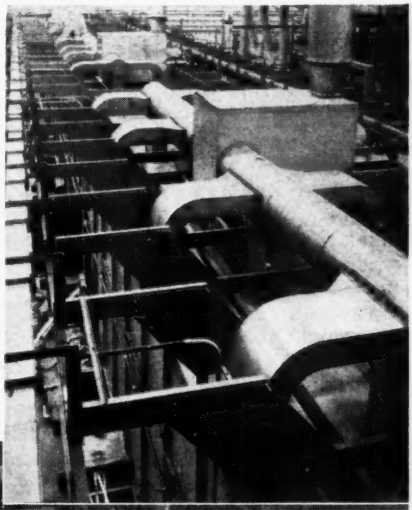


Fig. 5 (right)—A view of the top of an automatic spray pickling machine showing the two air washers as well as the stainless steel ductwork used to draw off objectionable fumes, and in the extreme left background, three gravity exhaust ducts which remove excessive water vapor from the cleaning section of the unit.

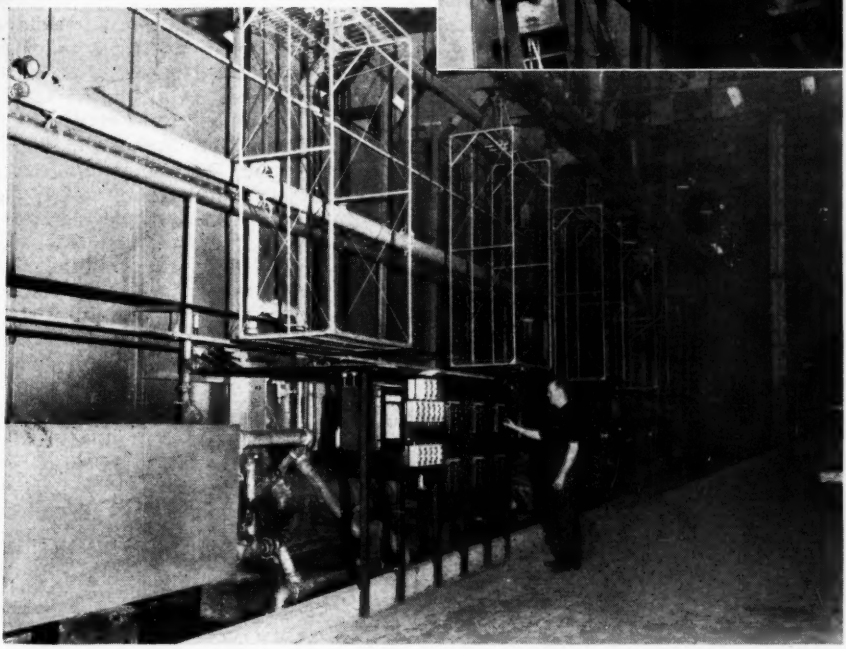


Fig. 6—The control panel mounted near this automatic spray pickling machine enables the operator to control the temperatures of the various heated processing solutions. The stainless steel pickling baskets shown in the photograph are returning from the ground coat dipping area to the loading end of the pickling machine for reloading.

Fig. 8 — Ground coat sprayed from a pressure tank is used to reinforce sharp edges of the dried roof panels prior to firing.

to the sewer. Brass pipe and brass nozzles are used for the water spray, so that rusting, liming, or clogging of the system is prevented.

Leaving the water rinse chamber, parts enter the alkali cleaner section where a solution containing 2 ounces per gallon of Wyandotte alkali cleaner is sprayed on the work to remove the last traces of drawing compounds, stamping lubricants, and other surface contaminants from the parts. As in the case of the emulsion cleaner, the alkali cleaner is circulated continually by a 625-gallon per minute pump for each side of the machine. The drains from both sides return the solution to a 2700-gallon storage tank. The tank, guard rails, tunnel interiors, pipes, orifices, and steam coils in this section of the unit are steel, as in the case of the emulsion cleaning section.

Following the alkali cleaning operation, parts are rinsed in a three-stage spray rinse section. Fresh water is added in the third stage so that the final rinse leaves the parts very clean; both the second and third stages drain into a 1400-gallon tank from which two 400 g.p.m. Duriron pumps circulate the rinse to stages 2 and 1; the drain from stage 1 is connected to the sewer. This section of the machine, as well as the solution storage tank, is lined with rubber. Stainless steel pipes, orifices, and guard rails are used. This

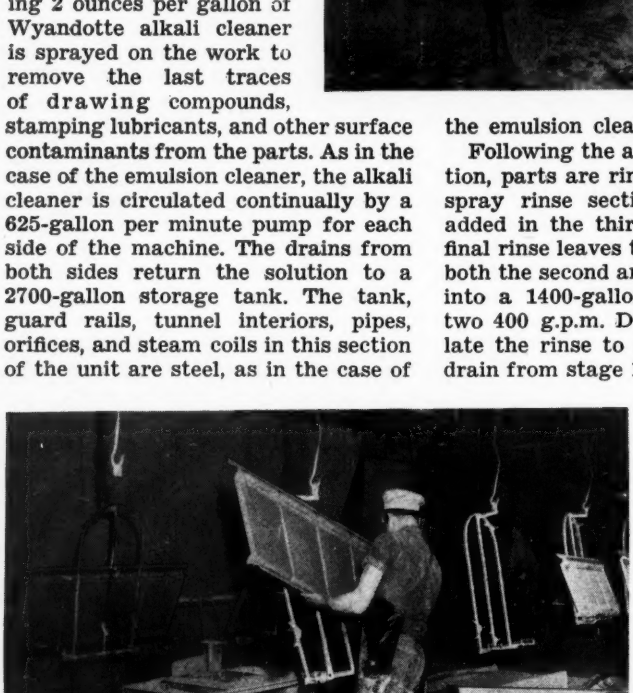


Fig. 7—Cleaned and pickled roof panels are dipped in ground coat and then hung on racks suspended from a moving conveyor for draining and drying. Enamel draining from the parts can be reprocessed and re-used.

is done, not because of the corrosive nature of the rinse, but due to the fact that the rinse section joins the acid section and would be affected by the corrosive overspray from that area.

Parts are next subjected to a hot spray of 7 to 10 per cent sulfuric acid, which removes rust and welding scale. The acid, heated by lead steam coils in two tanks totaling 3500 gallons capacity, is circulated through the system by four 500 g.p.m. Duriron pumps. In this section of the twin-tunnel machine, lead pipes and orifices and stainless steel guard rails are used. The tunnels and the storage tanks are rubber-lined. Rubber-lined steel pipes are used for handling the acid solution outside the spray chamber proper. A No. 15 Clarage exhaust fan draws fumes from this section of the machine through stainless steel ducts into an air washer and then exhausts the washed air above the plant roof. In Fig. 5 is pictured the stainless steel exhaust duct system and the air washers located above the automatic spray pickling machine.

A three-stage rinse follows the pickling treatment. Cold water is sprayed on the ware in the third stage so that parts may be rinsed completely free from acid and metal salts; the drains from both the third and second stages lead into a 1460-gallon rubber-lined storage tank from which two Duriron pumps circulate the rinse at the rate of 800 gallons per minute through stages 2 and 1; stage 1 drains into the sewer carrying away most of the reaction products formed on the metal surface, as well as most of the excess acid still remaining on the ware. This rinse section of the machine is rubber-lined as are the exterior transfer pipes. Stainless steel pipes, spray nozzles, and guard rails are used in the rinse chamber.

The job of rubber lining the tunnel sections in each of the two automatic spray pickling machines at Lustron, as well as the various solution tanks mentioned above, posed quite a problem. The work was accomplished by the Manhattan Rubber Division of Raybestos-Manhattan, Inc., through the employment of sandblasting to roughen the steel surface, followed by the application of a special primer to promote bonding of the subsequent rubber coating to the steel surface.

Rinsed ware is next sprayed with a solution containing between 2.0 and 2.5 oz./gal. of nickel sulfate and held at a pH of 2.8 to 3.0. This treatment forms a nickel coating (0.08 to 0.10 grams of nickel per square foot of sur-

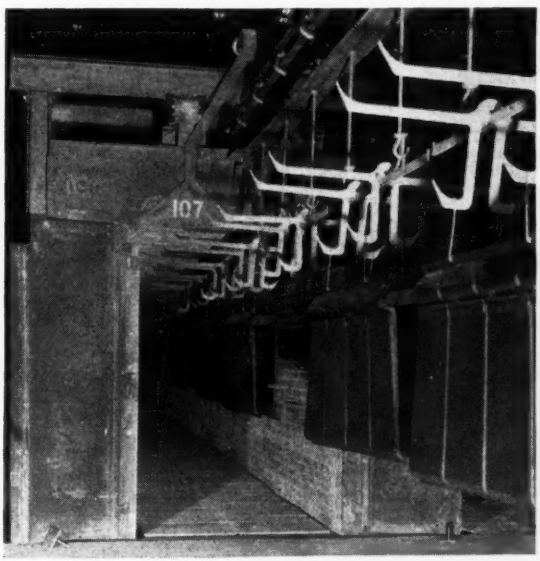


Fig. 9—Lustron Home roof panels emerge from a combination gas and oil-fired furnace where the dry porcelain enamel is fused to the steel at a temperature of 1300 deg. F.

face) by means of a simple chemical reaction and without the aid of electric current. The adherent nickel coating so formed is a key factor in the whole production system and is responsible in part for the success of the process. The nickel solution, heated in a 5600-gallon rubber-lined storage tank by stainless steel steam coils, is pumped through the system by four Worthington pumps at a rate of 2600 gallons per minute. Stainless steel pipes, nozzles, and guard rails are used in the rubber-lined spray chamber, and pipes connecting the pumps with the tank are stainless steel.

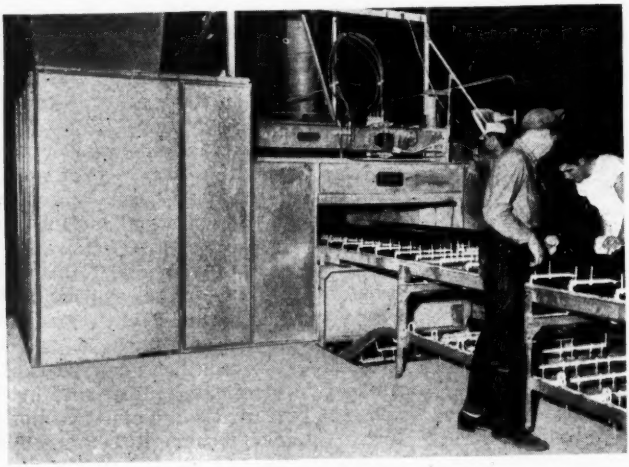


Fig. 10 — A view of one of the DeVilbiss automatic spraying machines used for spraying acid resisting enamel over the ground coated and fired Lustron Home panels. The Conveyor Systems pin-type conveyor which carries the parts through spraying and drying operations dips through a shallow sump as it returns so that the pins may be washed free from excess porcelain enamel. The cabinet and exhaust pipe shown at the left of the photograph draw off overspray enamel dust into an air washer.

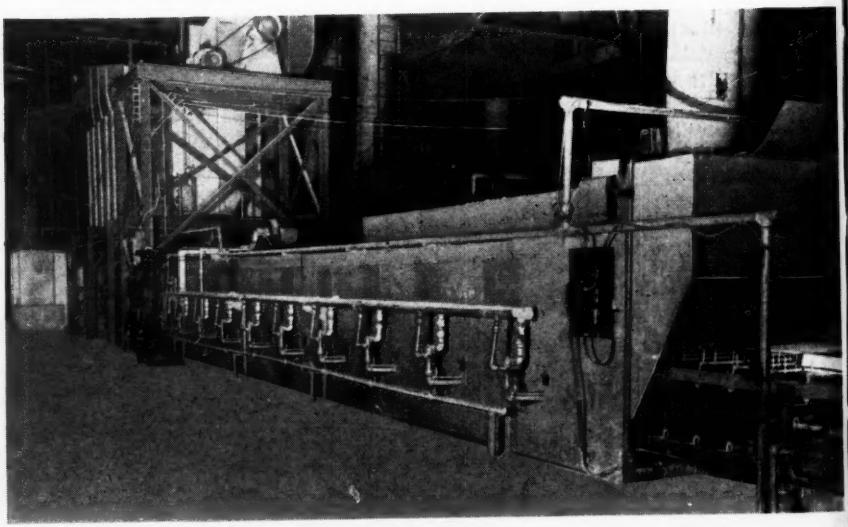


Fig. 11—A view of one of the Despatch gas-fired dryers used in connection with each automatic spray machine. At the left of the photograph may be seen another view of the air washing unit mentioned previously.

Fig. 12—Parts coated with dry acid-resisting enamel are carried through a gas and oil-fired porcelain enameling furnace by a Webb overhead conveyor so that the enamel may be fused to form a smooth glassy surface.

The architectural panels, now coated with nickel, are next sprayed with a weak solution containing ¼ to ⅜ oz./-gal. of sodium cyanide in addition to a small amount of caustic soda. This solution neutralizes excess acid and washes away the film of nickel solution remaining on the parts. Since this is an alkaline solution, the equipment used, as well as the tunnel interior, is plain steel. The cyanide solution is circulated by two pumps connected to a 2700-gallon storage tank at a rate of 1250 gallons per minute. This solution, as well as the nickel solution mentioned above, is filtered continuously by filters connected to the respective storage tanks to remove precipitated iron and sludge.

Following the cyanide wash, parts are neutralized by being sprayed with a weak solution of borax and caustic soda (14 lb. borax and 35 lb. caustic soda in 2700 gallons of water). This solution completely removes all traces of acid or the cyanide wash, and leaves a very thin alkaline film on the metal surface which is beneficial to the subsequent ground coat dipping operation. Unlined steel equipment is employed in this section of the machine, the pumps and tanks being the same size as those in the cyanide wash unit. An air washer similar to that installed

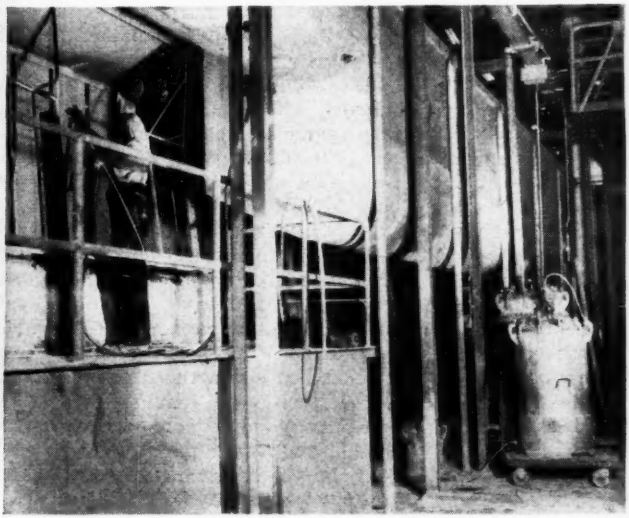


Fig. 13 — Two operators working at different levels in this spray booth coat the underside of pickled panels with reclaimed enamel. The special design of the spray booth, featuring a venturi - type opening as can be noted in the photograph, makes possible an adequate air movement, yet removes less air per minute than booths of conventional design.

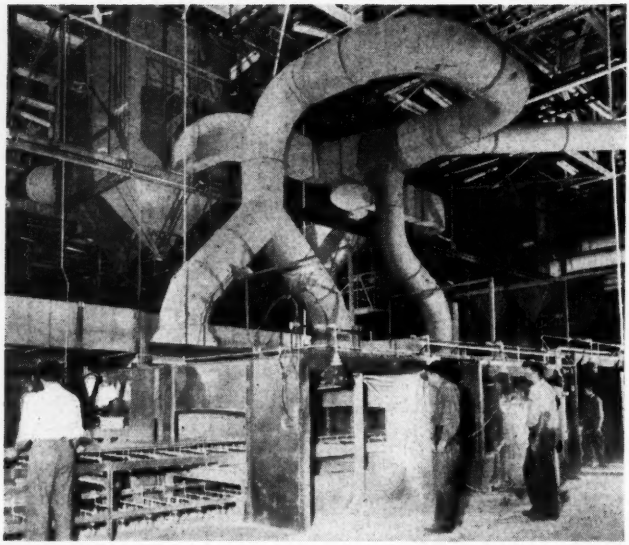


Fig. 14—A view of a Binks automatic spray setup used for coating interior house panels. Also shown in the photograph is one of the many units used to draw off enamel dust and filter it from the air which is then returned to the room without heat loss.

over the acid tank washes fumes from air exhausted in the nickel sulfate, cyanide, and neutralizer sections and may be seen in the foreground of Fig. 5. As the baskets of ware leave the neutralizing section, a gas-fired hot air dryer served by two No. 15 Clarage fans (one for each tunnel) removes all moisture from the metal surface.

The solutions discussed above are heated by steam coils submerged in the various tanks, and the temperatures are controlled by Taylor valves which are used in conjunction with Micromax controllers. A view of the control panel installation is shown in Fig. 6. A Leeds & Northrup Micromax recorder keeps a continuous record of the pH of the nickel sulfate solution. In addition to steam coils, two Eclipse immersion gas burners are installed on the tanks containing the emulsion cleaner, alkali cleaner, cyanide rinse, and soda-borax neutralizer to assist in maintaining correct solution temperature under all conditions.

A system of strict chemical control of the solutions used for cleaning and pickling has been set up. The alkali cleaner is tested once per hour, and the sodium oxide content is held between 0.40 and 0.60 per cent. The cleaner is discarded once per week, or more frequently if the calculated increase in sodium oxide content per pound of cleaner added is not obtained. The sulfuric acid pickling solution is analyzed once per shift for acid content and iron sulfate. The acid is held between 7 and 8 per cent. The solution is dumped once per week or at any time that the iron sulfate content rises above 10 per cent. The nickel sulfate solution is tested once per shift for pH, nickel, and iron. The pH is maintained between 2.8 and 3.0 and the nickel sulfate between 2 and 2.5 ounces per gallon. The cyanide rinse is checked once per shift for the sodium oxide content, which is held between 0.1 and 0.2 per cent. The neutralizer is analyzed every hour for sodium oxide which is held at 0.10 to 0.15 per cent. Both neutralizer and cyanide solutions are discarded once a week.

As indicated on the floor plan, Fig. 2, one conveyor leaving the spray pickling machine transports the processed and dried parts to a ground coat dipping area (upper left-hand corner of Fig. 2) where the parts are

removed from the pickle baskets. The empty baskets then return along one side of the pickle machine (see Fig. 6), moving toward the loading area where they are again loaded for another cycle.

Enameling Exterior Panels

Cleaned and pickled parts for the Lustron Home are removed from the pickle baskets and dipped in a water slurry of the ground coat or first porcelain enamel coat. This slurry is obtained by grinding the enamel frit in water together with other necessary chemical ingredients in huge ball mills until the fineness averages 6 to 8 per cent retention of solids on a 200-mesh screen. The resulting water slurry is adjusted to an apparent density of 1.70 to 1.72 and the consistency is adjusted so that ware dipped in the material will pick up a dry coating of 35 to 38 grams per square foot of metal (total both sides). A view of the ground coat dipping operation is shown in Fig. 7. Parts dipped in ground coat are placed on racks suspended from a monorail trolley conveyor for draining and drying prior to firing. The ground coat dipping conveyor moving at 30 feet per minute carries the wet coated parts into and through a dryer, the entrance to which can be seen in Fig. 7, directly behind the man performing the dipping operation. While the parts are in the Despatch open-flame gas-fired dryer, maintained automatically at a temperature of 350 deg. F. by a Brown recorder-controller, the water evaporates from the enamel, leaving a dry adherent coating which can be fired or fused into a smooth glassy surface. Due to the tendency of the enamel to drain off sharp edges, such areas on the part are reinforced with ground coat sprayed on in a spray booth located immediately adjacent to the dryer exit and just ahead of the furnace. Figure 8 shows a sprayer reinforcing sharp edges with ground coat.

Parts coated with dry ground coat are transferred from the dipping conveyor to an overhead furnace conveyor which carries them through one of the 180-foot long Boland muffle furnaces

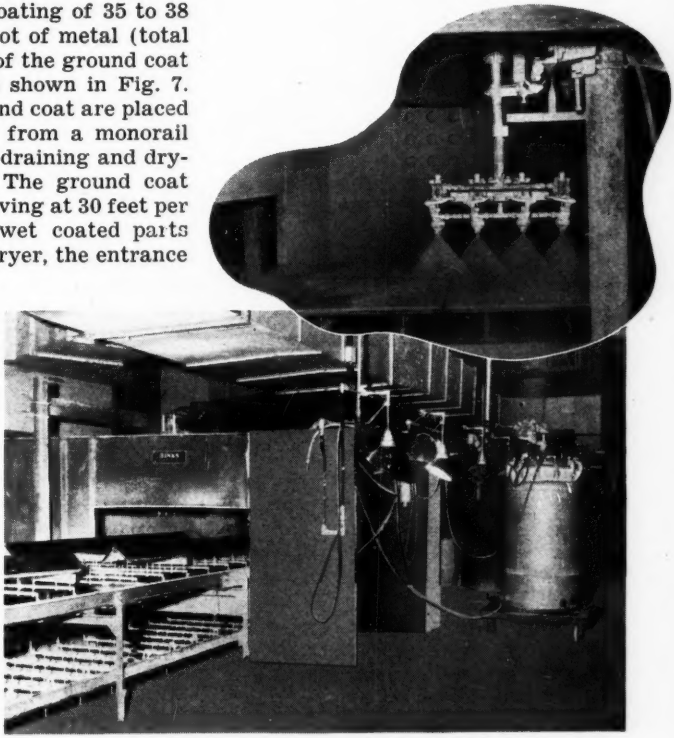


Fig. 15 — A close-up view of an automatic spray machine

Fig. 16 (above, right) —A close-up view of a spraying head in an automatic spray machine showing the four guns coupled to one manifold, as well as the traversing mechanism

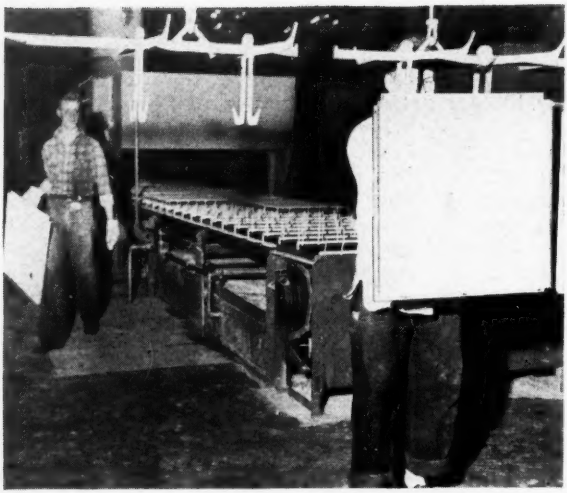


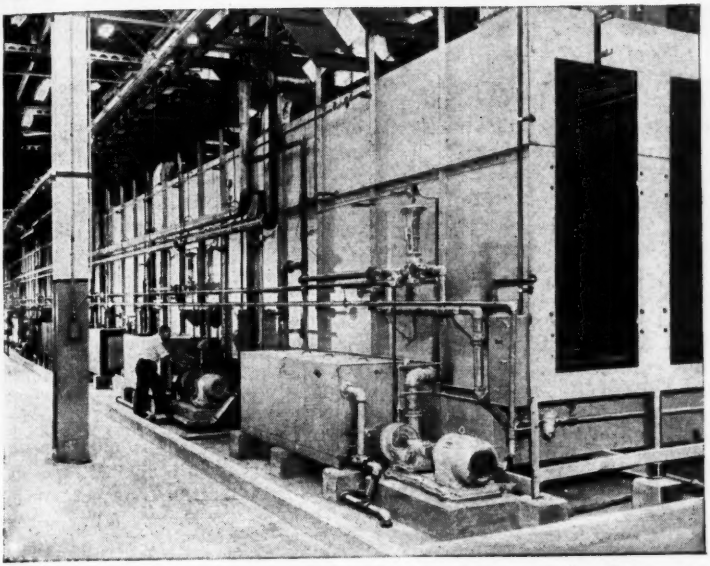
Fig. 17—After drying, interior house panels coated on both sides with porcelain enamel are hung on a furnace chain to be carried through a furnace for firing.

(60 feet pre-heat; 60 feet firing zone; 60 feet cooling) operated at 1300 deg. F. and fired by combination gas-oil burners. The furnace chain speed may be set at any speed between 10 and 15 feet per minute. In the left background of Fig. 8 may be seen the operators who load the dry ware on the furnace chain. Figure 9 is a view of the exit end of the furnace showing the fired parts now covered with a glass-smooth coat of porcelain enamel. Although, as will be discussed later, interior parts of the Lustron Home may be finished with one coat of porcelain enamel, exterior parts, roof sections, for example, are given an acid-resisting "cover" coat to provide an extra measure of weather resistance. Such parts are removed from the furnace chain shown in Fig. 9 and sprayed automatically while traveling horizontally under a set of four automatic spray guns on a pin-type conveyor, as shown in Fig. 10. The acid-resisting cover coat enamel is supplied to the oscillating guns from 60 or 120-gallon pressure tanks at a fluid pressure of approximately 23 pounds per square inch and sprayed at an air pressure of about 70 pounds per square inch. A coating of 37 to 40 gm. of enamel/sq. ft. of surface (weighed after drying) is secured. Operators located in booths immediately behind the automatic spray booth touch up edges with manual spray guns as the parts move past them at a speed of 12 feet per minute. The parts are then dried as they pass through a Despatch gas-fired dryer adjoining the spray booths. A view of the dryer, in which a temperature of 180 deg. F. is automatically maintained, is shown in Fig. 11. When dry, parts may be hung on the same furnace chain as the ground coated parts and fired. Figure 12 shows parts entering one of the straight through muffle furnaces for firing. Fig. 2 illustrates how the furnace conveyor is located so that both ground coat and cover coat ware may be processed at the same time. Fired parts are inspected and moved to the assembly area by transport conveyors (not shown on Fig. 2).

Enameling Interior Panels

Interior side wall panels and sections are processed in a most efficient, economical and satisfactory manner, using a cycle of operations varying slightly from that previously described. Pickled interior panels are sprayed on the underside with a coat of 20 to 30 gm./sq. ft. of reclaimed enamel (weighed after drying) while transported at a speed of 36 ft./min. on racks through a Despatch venturi-

SPRAY PICKLING FOR BETTER ENAMELING

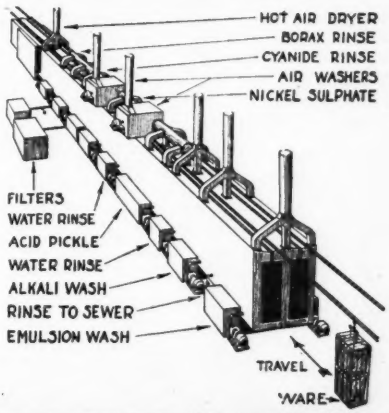


METALWASH Spray Picklers automatically prepare LUSTRON HOUSES for porcelain enameling

At Lustron Corporation's plant in Columbus, Ohio, mammoth Metalwash spray picklers clean the various parts of steel houses prior to porcelain enameling, automatically taking them through the cycle as shown.

These machines produce clean, nicely etched surfaces, properly nickel coated, neutralized and dried. Automatic operation eliminates handling, increases production, and permits accurate control of the entire cycle. Rejects due to improper cleaning and pickling are virtually eliminated, and adherence qualities are greatly improved.

For better metal cleaning submit your problems to METALWASH.



METALWASH MACHINERY CORP.
149 - 155 SHAW AVENUE IRVINGTON 11, NEW JERSEY

type two-level spray booth (see Fig. 13). The conveyor carries the parts past a loading area where they are transferred to an automatic spray machine so that the face side can be sprayed with a coat of 47-50 gm./sq. ft. of cover enamel of one of the many colors available. It is worthy of note that by this process only a single coat of porcelain is required, and further, it is possible to spray both sides of a part, then dry and fire both simultaneously. Figures 14, 15, and 16 illustrate one of the automatic spray installations.

Panels pass through the automatic spray and edging operations and are again dried in a dryer as previously described. The parts may then be hung on a muffle furnace chain, as in the case of the small panels shown in Fig. 17, or, in the case of 8-foot long panels, may be fired in the world's largest electrically heated porcelain enameling furnace (two of which have been installed at Lustron). The 180-foot long Lindberg electric furnace, a view of which is shown in Fig. 18, maintains a firing temperature of 1300 deg. F. with the aid of 32 separate automatic controllers for various sections of the furnace. In addition, the furnace chain contains three traveling thermocouples, one of which is always in the furnace. By this means and by the employment of a recording device, a record of furnace performance may be obtained every 15 minutes. Low velocity air curtains on each end increase the thermal efficiency of the furnace, and electric "eyes", located on each side of the furnace entrance (see foreground of Fig. 18), ensure that all ware which enters the furnace will have proper clearance.

Employee health, plant cleanliness, and economy are all served by the practice of collecting enamel overspray from spray booth exhausts and returning the filtered air back to the plant building. In Figs. 11, 14, and 19 may be seen views of some of the many DeVilbiss air washers and American Wheelabrator Dustube Collectors used for removing dry enamel dust from the air, and making possible the reclaiming of the enamel which

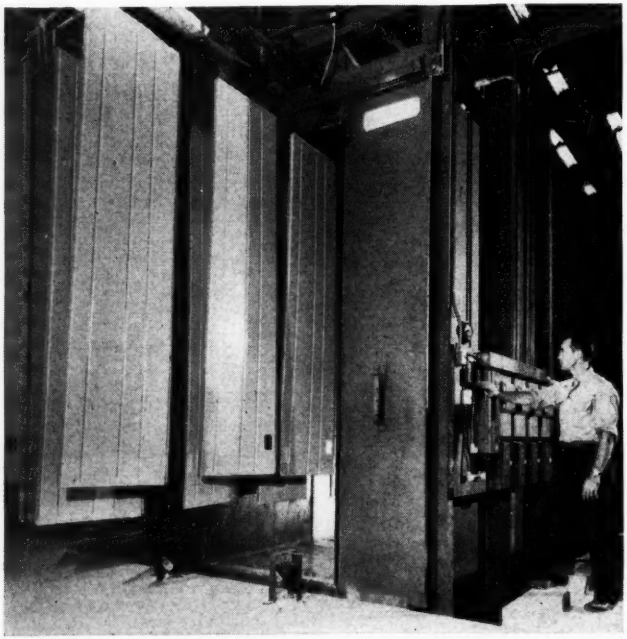


Fig. 18—Large panels, after being sprayed and dried, pass through the 180-foot long, 11-foot high Lindberg electric furnace, where enamel fusing takes place.

A plating "Success Story"

In the Rapid Rise of the Cadmium & Nickel Plating Company from Obscurity to a Leading Position,

There's an Idea for Your Business!

From a single hand-plater in a shed to one of the biggest job shops on the Pacific Coast in the space of 18 years—that's the story of the Cadmium & Nickel Plating Company, Los Angeles. It's a personal tribute to the energy, ability and vision of two men—M. W. Hays and O. S. Pendlay—and to the Udylite equipment around which they built their business.

RAPID GROWTH IN FIRST DECADE

It didn't take Messrs. Hays and Pendlay long to see that the Coast offered plenty of business for the shop equipped to turn out plating work fast and well. They moved to bigger quarters the year after they started (1931), ordered new Udylite barrel-plating equipment, and began getting into *volume* work. Growth came rapidly. Bigger orders called for new Udylite Semi-Automatic machines . . . then Full Automatics. By the time they lit the candles on their 10th birthday cake, they were moving again to larger and more modern quarters . . . the fine 22,000 sq. ft. structure they occupy today.

UDYLITE EQUIPMENT "THE BACKBONE"

Tour their plant today and you'll see the finest in production plating operations. There's a complete Barrel Plating Division—two big Udylite Full Automatics that deliver up to 100 racks per hour—a versatile Udylite Semi-Automatic 1500 gal. Nickel Plating unit—and a battery of high-efficiency Udylite Rectoplaters. Efficient planning speeds the work directly from the raw stock department through the various cleaning and plating cycles and out for shipping.

Co-owners Hays and Pendlay give much of the credit for success to better plating methods, made possible by Udylite-engineered equipment. "It helped us cut costs—improve quality—develop fast output for prompt delivery—and gain a 'quality' reputation we're proud of. We look forward to even bigger things in the years ahead," the enterprising C&NP executives report.

PUT UDYLITE IN YOUR PLANS

There's food for thought here for other progress-minded plating executives. Let one of our technical men go over *your* plans with you, and show you how Udylite's high-efficiency equipment will improve your operations, methods and processes. There's no cost or obligation for this expert technical assistance that can point the way to better quality, faster output, more business and greater earnings and growth in your plant. We'd like to work with you, so drop us a line soon. Address: The Udylite Corporation, Detroit 11, Michigan.

Pioneer of A Better Way in Plating

THE Udylite CORPORATION

THE UDYLITE CORPORATION, DETROIT 11, MICHIGAN

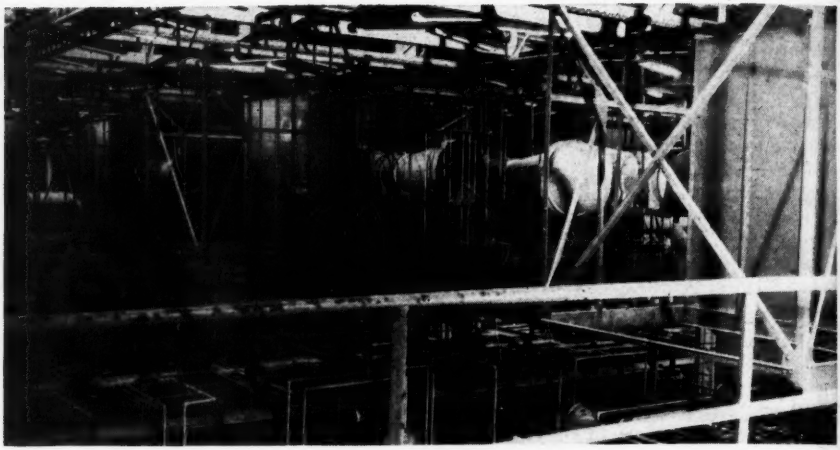


Fig. 19—A view showing several of the collecting and filtering units which remove porcelain enamel dust from the air before returning the cleaned air to the plant building

would otherwise be lost. Great savings in heating equipment are also realized, since the great volume of air handled need not be drawn in from outside the plant and heated.

Large volumes of natural gas are consumed at Lustron in heating the nine gas-oil combination enameling

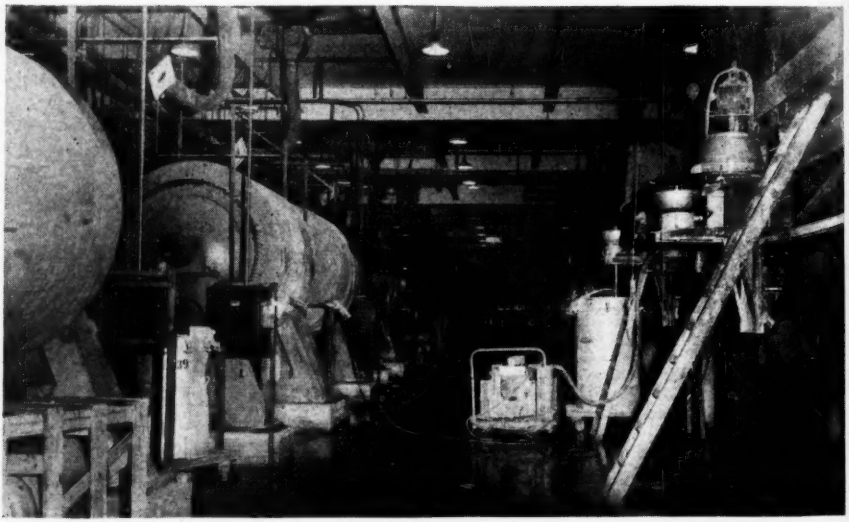
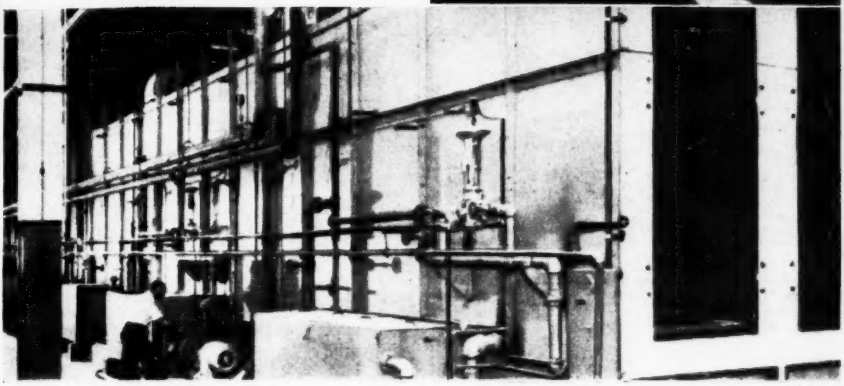


Fig. 20—Charged through overhead hoppers and ducts which can be seen in the upper left-hand corner of this photograph, the various steel-jacketed ball mills in the Lustron mill room grind the coarse glass particles into a fine water slurry. The mill room has a daily capacity of more than 200,000 lb. of enamel.

To Insure the *Lustre* of LUSTRON HOMES



Metalwash Machinery Corp. selects MANHATTAN Rubber Lining

In Columbus, Ohio, the largest porcelain enameling plant in the world has recently been completed for Lustron Corporation. Production lines are turning out gayly colored Lustron Homes in large volume.

To insure the lifetime fusion of porcelain with steel panel sections, Metalwash Machinery Corp. of Irvington, N. J., designed the largest spray pickling machine ever built. Raybestos-Manhattan engineers were entrusted with the rubber lining of this equipment . . . another "World's Largest" rubber lining job accomplished by Manhattan.

House sections are conveyed through a series of washes and rinses—including Alkalis, Acid Pickle, Nickel Sulphate, Cyanide and Borax. The process must provide a clean, nicely etched surface, properly nickel coated for perfect adherence of the porcelain enamel. Manhattan Rubber Linings were chosen to protect this costly equipment against corrosion by these active chemicals at high temperatures.

Whether your metal finishing process is dramatic or routine—it's sound economy to call a Manhattan Engineer for your problem in Rubber Lining.

Keep Ahead with Manhattan

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RM

RAYBESTOS-MANHATTAN, INC.

Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose • Fan Belts • Brake Linings • Brake Blocks • Clutch Facings • Packings • Asbestos Textiles • Powdered Metal Products • Abrasive & Diamond Wheels • Bowling Balls

Fig. 21—A view of that portion of the 100-foot wide 1400-foot long mezzanine located directly above the mill room shown in Fig. 19. In the foreground may be seen the huge metal hoppers used for pouring the various ingredients into the ball mills located on the floor below. At the right can be seen one row of the 900-gallon storage tanks into which milled porcelain enamel is pumped for temporary storage.

furnaces, as well as the many gas-fired dryers, ovens, and other units. To ensure against production interruption by reason of natural gas curtailment, a Thomas standby LP-Gas system has been installed for use in dryers. This system consists of storage capacity for 240,000 gallons of propane together with mixing equipment designed to make the propane-air mixture interchangeable with natural gas. Standby fuel for muffle furnaces in case of gas curtailment is provided in a large oil tank with a 5000-barrel capacity.

Mill Room

Porcelain enamel frit received from suppliers as a coarse, granulated glass is mixed with water, clay and other chemicals and milled to a very fine slurry in large steel ball mills, lined with porcelain brick and employing porcelain balls as grinding media. Figure 20 is a view of the Lustron mill room. The 13 International and 8 Patterson ball mills installed in the mill room have capacities as follows: 8 mills will grind 7500 pounds of frit per load; 8 mills will grind 3000 pounds; 5 mills can grind 2000 pounds of frit per load. Mills are loaded through large hoppers set in the floor of the mezzanine located above the mill room. After enamel has been milled to the desired fineness (varying from ½ to 8 per cent on a 200-mesh screen), it is drained from the mills into a portable tank and then pumped in turn through a Rotospray, fitted with a 60-mesh screen, and a magnetic separator so that frit particles and all foreign material, including iron fragments, will be removed. The screened enamel is then pumped into one of the 27 Patterson storage tanks located on the mezzanine near the loading hoppers. The storage tanks as well as the loading hoppers may be seen in Fig. 21.

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New in Precision Barrel Finishing

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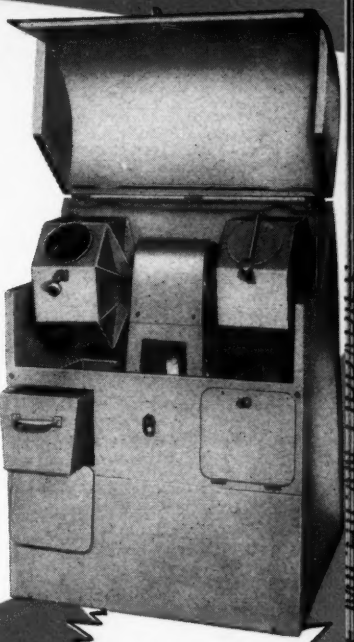

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ght strategically located SUPER-EEN Engineering Clinics have en established to provide you h quicker and better sample cessing. These are YOUR clinics use *without obligation!* If not venient to visit the clinic near- you, you may send parts for ple processing. Write today for mpt arrangements.

The SUPERSHEEN Process can be applied to produce the precise result in a wider range of work—from *fast* deburring to the *gentle* honing of stampings, castings, forgings and machined parts . . . even where micro tolerances are a must! The "before and after" photo at left is unretouched.

ALMCO Supersheen

DIVISION OF QUEEN STOVE WORKS, INC.

Factory and General Offices: Albert Lea, Minn.

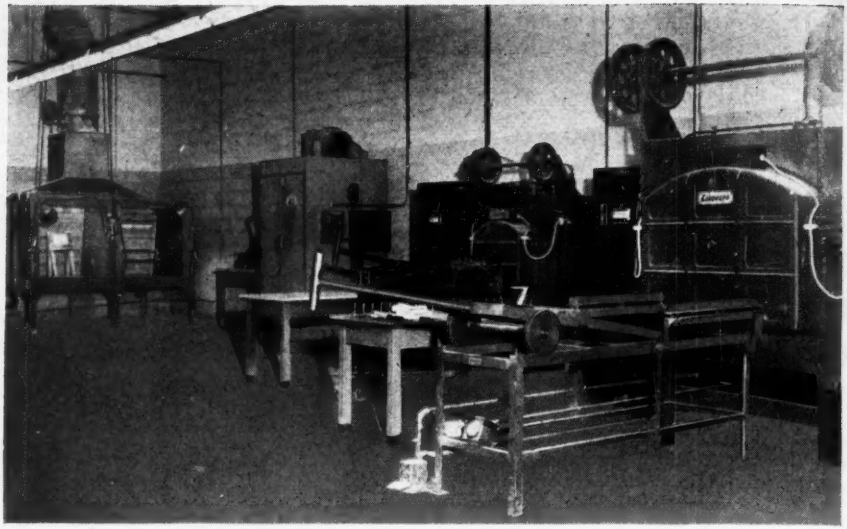


Fig. 22—This corner of the well equipped ceramic laboratory shows the two-compartment spray booth, drying oven, and the two electrically operated furnaces for firing sample panels of various sizes.

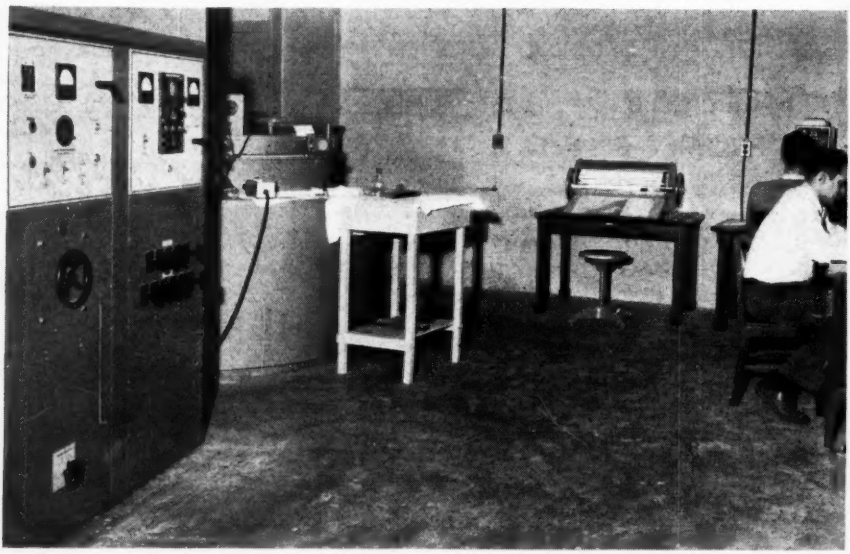
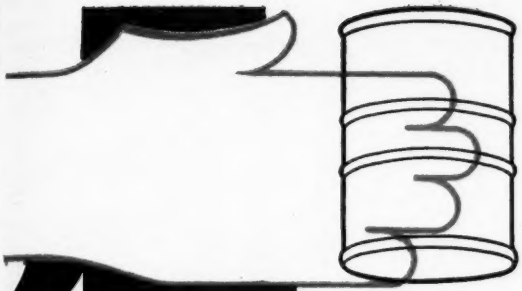


Fig. 23—This section of the physical testing laboratory houses a considerable amount of scientific equipment. The unit shown at the left is the power source for the spectrograph located directly behind it. At the extreme right one physicist may be seen recording the results of spectrographic analysis with the aid of a densitometer while his associate reviews the results of recent analyses.



THE OTHER HAND... *and how it helps you control rising costs!*

One hand represents SUPPLY . . . the other, SERVICE.

Supplying you with high quality materials that produce finer, longer-lasting finishes is Glidden's first responsibility.

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PROOF PANEL

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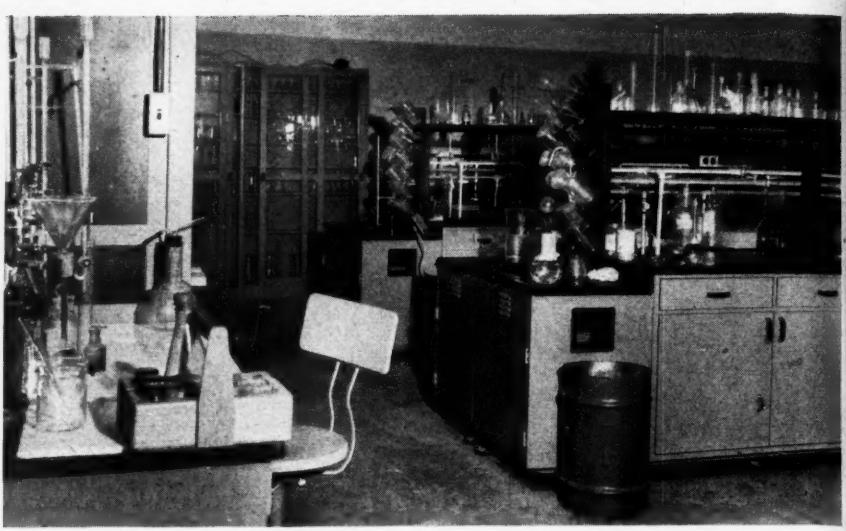

Fig. 24—A view of the well equipped chemical laboratory which is used for analyses of raw materials, as well as for control of the manufacturing process and its associated problems

Enamel is stored in the 900-gallon porcelain block-lined storage tanks and agitated continually until it can be drawn off into dip tanks or spray tanks for use.

Laboratories

The milling operation, as well as the enamel process itself, is controlled in a well equipped ceramic laboratory, a view of which is shown in Fig. 22. Here, fineness, specific gravity, dipping weight, and other factors are measured and sample plates sprayed, dried, and fired. Sample batches of enamels may also be milled and tested.

Close control over raw materials as well as over the manufacturing processes is accomplished in Lustron's physical and chemical laboratories. The physical laboratory, a corner of which is pictured in Fig. 23, analyzes steel, enamel frit, color oxides, opacifiers, and other raw materials for certain essential chemical elements and thus determines not only the purity of the raw materials but ensures that specifications are being met. A spectrograph and densitometer, in addition to other equipment, are used for this purpose. The chemical laboratory, a view of which is shown in Fig. 24, complements the work performed in the physical laboratory in checking raw materials, and performs routine process control work, such as checking the various pickling solutions, etc.

The visitor to the Lustron plant, after viewing the extensive facilities for mechanical handling and processing of the product, and the extensive laboratories fitted with the most modern equipment and staffed with well qualified chemists, physicists, and ceramic engineers, cannot help but leave with the impression that the Lustron Home is a product of unquestionable quality, produced in an efficient, economical manner in an ultra-modern plant.

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Plating Room Waste Disposal

By RAYMOND M. SHOCK

Executive Secretary
National Association of Metal Finishers, Inc.

THE platers of America are receiving increasing amounts of unfavorable publicity with regard to the discharge of cyanide, acids, and other poisonous materials into sewers, even though other industries use larger quantities of stream polluting chemicals which are dumped into sewage systems.

The alarming and increasing danger of death and obliteration of the nation's wild life caused by the improper disposal of waste chemicals is a serious problems to all industries using acids and other chemicals, and not alone a small group of companies engaged in the plating business. Even though a number of law suits have been filed against offending companies, compensation in dollars will not solve the problem.

The National Association of Metal Finishers has discussed and attempted to assist in the solution of this vital problem during the past few years. Also, the Research Committee of the American Electroplaters' Society has established Project No. 10, in operation for several years, to help solve the pollution problem. In a recent letter Dr. Louis Weisberg has pointed out that it is essential to enlarge the research program and put the project on a full-time basis so that both cyanide wastes and acid wastes (including chromic acid) can be investigated simultaneously. A tentative budget of approximately $25,000 per year has been proposed to make possible the employment of additional personnel and the installation of additional special equipment at Yale University. This is in addition to the present budget which will not be reduced in any event. It is to accelerate and enlarge the scope of the research project to include requirements necessary to the solution of the problem and make possible the termination of the project for practical purposes within one year.

Every plater, as well as members of all other industries which discharge waste products of a poisonous nature, should make an investment in present and future welfare by becoming a sustaining member of this project at $100.00 or more per year. The prompt solution of this serious problem is most urgent.

In Michigan, through the efforts of the National Association of Metal Finishers, The Plating Institute, Detroit Branch of the A.E.S., cooperation has been secured from the Stream Control Commission, the secretary of which, Milton Adams, has appointed a consultant group on cyanide waste disposal, tentatively to consist of: J. E. Cooper, Ford Motor Company; L. A. Danse, General Motors Corporation; Fred Carnham, Secretary, Grand Rapids Branch, A.E.S.; Clyde L. Palmer, City of Detroit; C. C. DeWitt, Director, Michigan State College Experiment Station; Gerald Burgess, member of the board of directors of The Plating Institute, Electro-Plating Service, Inc.; E. G. Swift, Saginaw In-

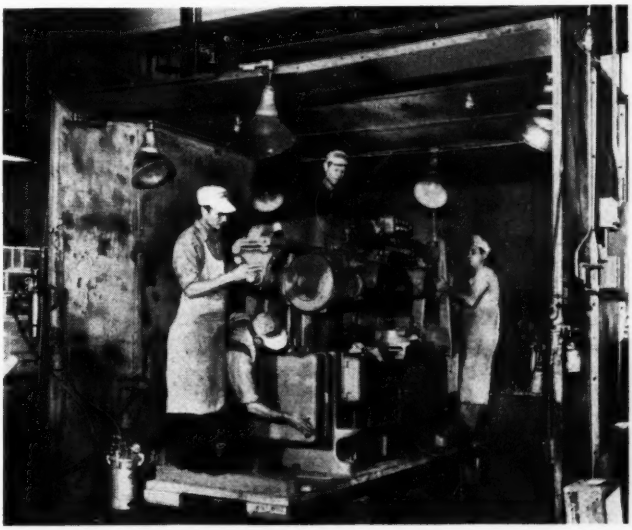
dustries; Milton Adams, Stream Control Commission; representatives of Chrysler Corporation and Michigan Manufacturers Association yet to be named.

This is an example of the cooperative effort initiated through associations and societies which will accomplish tangible results not obtainable by the individual plater. To join this cooperative effort, made on behalf of the entire plating industry, contact the National Association of Metal Finishers, Inc., any local branch of the A.E.S., or the Research Committee, American Electroplaters' Society, P. O. Box 168, Jenkintown, Pa. Your suggestions, assistance, and contributions are urgently needed so that the "poison" label may be removed from the plating industry.

Prompt Medical Attention Prevents Solvent Illness

WORKERS handling volatile solvents should be instructed to report promptly any feeling of discomfort. Dizziness, headache, eye difficulties, weakness, nausea, or stomach upset may be due to other causes, but they can also result from inhaling solvent vapors and may serve as an early warning that medical attention is required. Neglect of such warnings may lead to serious illness. Prompt medical attention, on the other hand, generally leads to complete recovery.

Some persons are especially susceptible to solvent illness, and even a rather mild exposure (cleaning a motor or wiping metal parts with a solvent-saturated cloth, etc.) may lead to illness. For this reason, early signs of discomfort should not be overlooked even when it seems unlikely that much solvent has been inhaled. Also, since skin contact with solvents sometimes leads to dermatitis, persons who develop skin difficulties after working with these liquids should report to a physician to prevent aggravation of their condition.—*Safety Research Institute, Incorporated.*



In a DeVilbiss water wash spray booth in the plant of the Barber-Colman Co., Rockford, Ill., four finishers are shown smoothing the exterior surfaces of a Barber-Colman gear hobbing machine. The surfaces have previously been filled and will be subsequently masked and sprayed with several coats of air dry machine tool gray lacquer to provide a lasting and pleasing finish.

(Photo courtesy Barber-Colman Co., Rockford, Ill.)

Barrel Finishing of METAL PRODUCTS

Part 28—Barrel Finishing in England; The Edmonds Burnishing Barrel

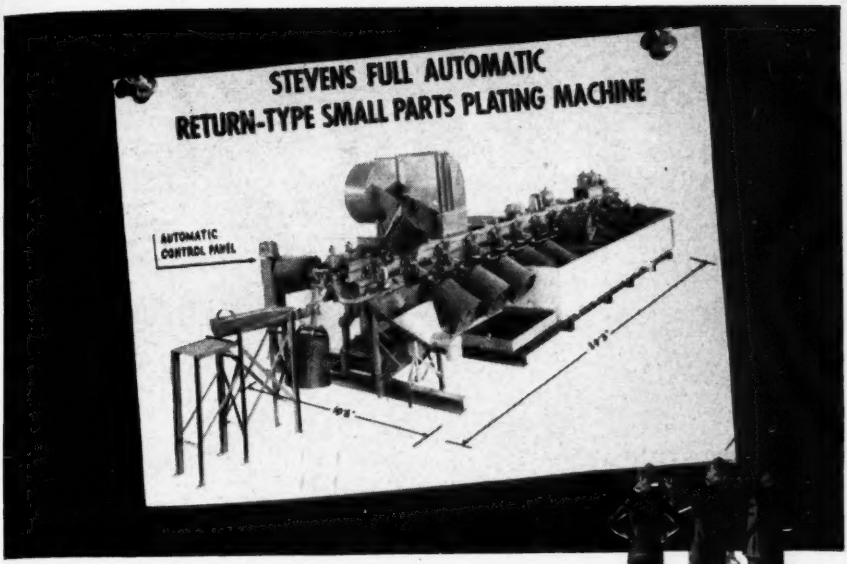
By H. LEROY BEAVER
Beaver Barrel Finishing Research
Lansdale, Pennsylvania

FROM time to time those of you who have faithfully followed this series of discussions on the barrel finishing of metal products will recall our promise that as soon as we could get sufficient accurate information covering some of the barrel procedure in England and its origin, we would supply this information in order that the bibliography of the subject which we are attempting to write might be complete.

It was our very good fortune to have had the opportunity to meet personally and have a quite protracted discussion with Sir Ernest Canning of W. Canning & Company, Ltd., one of the leading platers' supply houses of England, at the Annual Convention of the American Electroplaters' Society held this past summer.

In attempting to trace back the history of barrel finishing in the United States in an effort to determine just who was responsible for what changes or improvements in both barrels and materials for use in barrels, we were considerably surprised to learn that steel ball burnishing did not originate in the United States as we had been told and believed, but that it was of English origin. This brought us down to what was termed the Edmonds Barrel, and the earliest reference we could uncover relative to this barrel was that eight of them had been imported into the United States at Providence, R. I., early in 1901, and with these selfsame barrels also came the first steel balls used in this country. Prior to that time so far as we can learn, various materials were tried with varying degrees of success. The use of pebbles, crushed minerals, and the addition of various abrasives was considered experimentally prior to 1901. Balls and shapes of porcelain, and flint pebbles taken from the ocean at the base of the chalk cliffs both on the English and French coasts of the English Channel have been used for years, as have been the fractured and sized by-product materials of ceramic manufacturers.

Some of the older members of the barrel finishing fraternity have insist-



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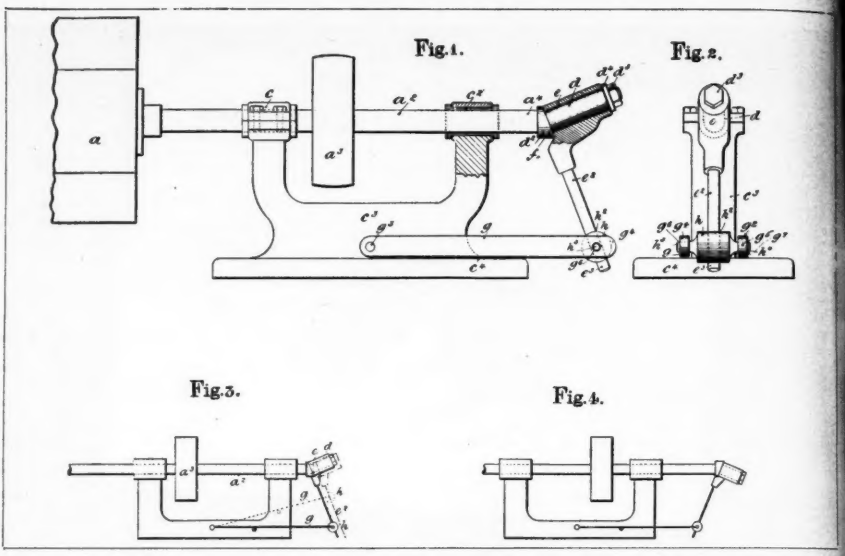

ed that the Edmonds Barrel was developed and that barrels of this type were in use here as early as 1875 or 1880. The originator of the barrel, Mr. Henry Edmonds, is still alive and we have from him not only his reaction to the work produced by his barrel but as well a copy of the patent issued to him in England and bearing the serial number 13139, the date of application being June 14, 1899. The device developing from this patent was termed a "shaking" barrel, and in order that those of you with a mechanical turn of mind might better understand just what this patent covers, we are reproducing for you the outline drawings with their references, being Figures 1, 2, 3 and 4 of the application itself and from which we quote for you as follows:

"The invention is particularly adapted for use in connection with a shaking barrel and will therefore be hereinafter particularly described as applied thereto.

The accompanying drawings show in Figs. 1 and 2 side and end elevations of the one end of a shaking barrel with the mechanism according to this invention fitted to its shaft, whilst Figs. 3 and 4 are diagrams illustrative of the change of position of the parts of the said mechanism and the consequent traverse of the shaking barrel shaft, the said traverse emanating from the shaft's own rotation. In these figures "a" is the shaking barrel body and "a2" is its shaft, which carries the said barrel and is supported within bearings "c," "c2," on a suitable frame, "c3," so that it can revolve and slide freely. A pulley "a3" is mounted fast on the shaft "a2" as part of its driving means. Upon the end "a4" of the shaft "a2" is formed an inclined arm "d," fitted with a collar or its equivalent, "d2," and with a screw nut "d3," and a washer "d4." One of the faces, "f," of the collar "d2" is at right angles to the axial line of the arm "d" as is also the inner face of the washer "d4." A sleeve "e" carrying a rigid link "e2," fits over the inclined arm "d" (a loose fit) and takes its abutment between the face of "f" of the

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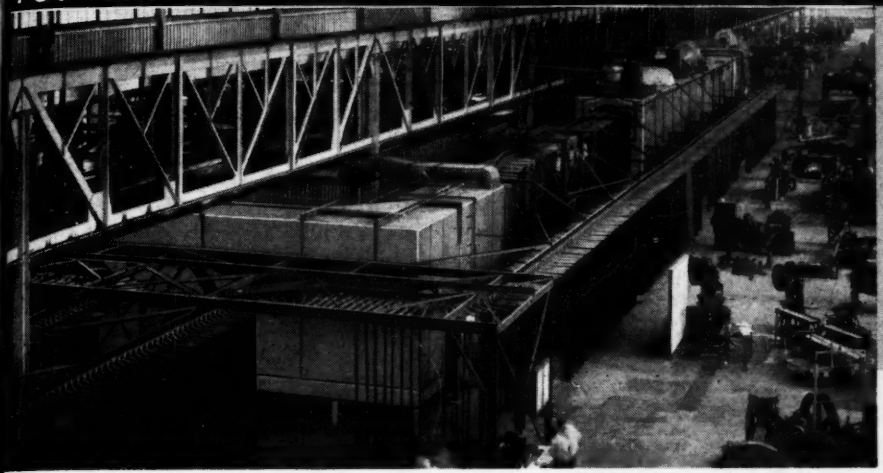

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collar and the inner side of the washer "d4." The other end "e3" of the rigid link "e2" is connected adjustably with a toggle or elbow joint to a pair of swinging levers "g," "g2," fulcrummed at "g3" to the frame "c3," of the shaking barrel shaft bearings. The levers "g", "g2" rest upon a flange "c4" of the frame "c3" as a stop in one direction, but they can swing upwards together as one. The said levers are coupled at their outer ends "g4," "g5" by a rotating cross bar "h," through a hole "h2," in which the link "e2" fits and can move freely up and down. The cross bar "h" rotates on trunnions "h3," "h4" which take within holes "g6," "g7," in the levers "g," "g2."

It will be observed from Fig. 1 that the axial line of the link "e2" is true to, or in a direct line with, the face "f" of the collar "d2" on the arm "e." This is preferable as a smoothly working movement is obtained thereby, but it is not absolutely necessary.

In working, the shaft "a2" is rotated from the pulley "a3" and the arm "d" is thereby caused to travel around therewith, but with a kind of gyratory movement in respect of the said shaft. This gyratory movement of the arm "d" is through the link "e2," and the levers "g," "g2" made to act upon the shaft "a2" to traverse it in the manner indicated by the diagrams Figs. 3 and 4, the latter showing the full extent of the movements of the shaft in either direction.

In the diagram Fig. 3, by dotted lines, the levers "g," "g2," and the rotatable cross bar "h" is shown swung upwardly in order to make it clear how the change of position of the said levers limits the leverage of the link "e2," and, as a consequence, the traverse of a shaft "a2," it being understood, however, that the said link is always coupled to the cross bar "h" by passing through the latter. In the

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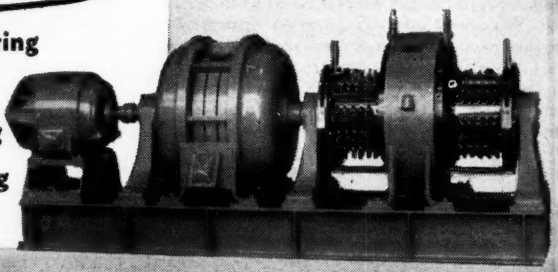

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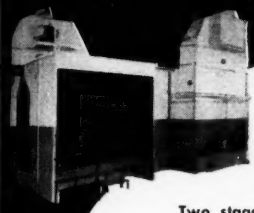
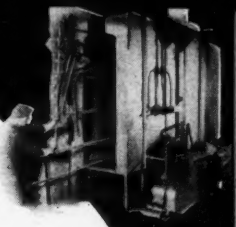


spray painting

Two staggered high exhaust Hydro Whirl spray booths used in painting of automobile hoods and fenders—note centrifugal fans contained in exhaust plenums



flo-coating

A small manual paint flow-coating unit in the plant of a farm equipment manufacturer—part of a system employing power and free conveyor and drop section cleaning position

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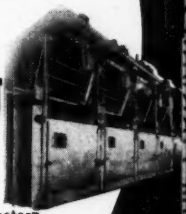
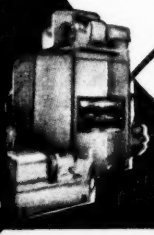


baking

Battery of large direct gas fired batch-type core baking ovens in large midwestern foundry—heaters located on overhead platform

washing

A 12 position rotary indexing power spray washer recently developed for preparing inside surface of television tubes—entire unit wholly safeguarded



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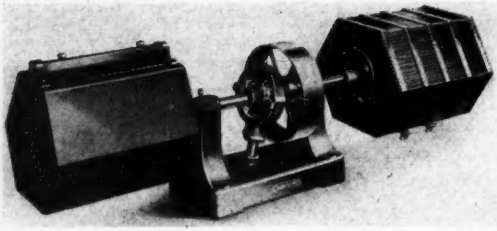


Fig. 5—Edmonds Patent Rapid Scouring and Burnishing Barrel No. 1228 A, C, and D

dotted position of the cross bar as shown in this figure, the link "e2," by passing through the hole in the cross bar, would pull rearwardly the shaft "a2" as shown by the chain line in this figure, and whilst the levers "g," "g2" are in the dotted position, and the link in the chain line as shown, the shaft "a2" would only be traversed back and forth a distance equal to the leverage or throw of the arm "e2" from the dotted position of the cross bar "h." The limiting movement as aforesaid is consequent upon the lessening of the length of throw of the link "e2."

The link "e2" need not move up and down within the hole "h2" of the cross bar "h," but it is preferably made to do so in order to obtain a smoother movement between the parts."

In the course of our discussion with Sir Ernest Canning, and particularly as it related to the Edmonds Barrel, we asked him whether this barrel was still being manufactured or used in England, and his answer was, "Indeed it is, we make it." Not only this but he has supplied us with two photographs of what is termed the Edmonds Patent Rapid Scouring and Burnishing Barrel No. 1228.

These barrels differ in both size and capacity from the average barrels of American manufacture, and are as follows:

1228A—Capacity 4 gallons
Barrel Size 18x12" or 18x18"
1228B—Capacity 10 gallons
Barrel Size 24x12" or 24x18"
1228C—Capacity 1 gallon
Barrel Size 12x8"
1228D—Capacity ½ gallon
Barrel Size 9x6"

It is suggested that the barrels 1228B and 1228A are suitable for use by brass founders and the metal trades, while 1228C is suited for small brass and steel goods, imitation jewelry, and so on, while 1228D is known as the "Jewellers Barrel," and is used for gold and silver goods.

Mr. Henry Edmonds has written a very interesting description of his reaction to his first use of steel balls in one of the barrels of his invention. At this time he was a manufacturer of what are termed "swivels," a small device used on watch chains to prevent the chain from buckling or twisting, and regarding these swivels, he says:

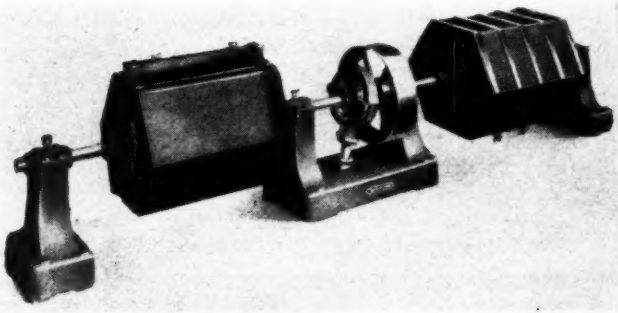
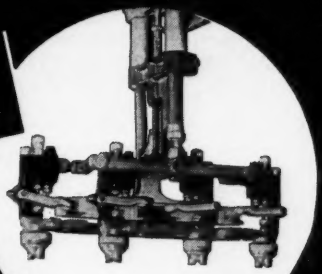


Fig. 6—Edmonds Patent Rapid Scouring and Burnishing Barrel No. 1228 B

ENAMEL automatically



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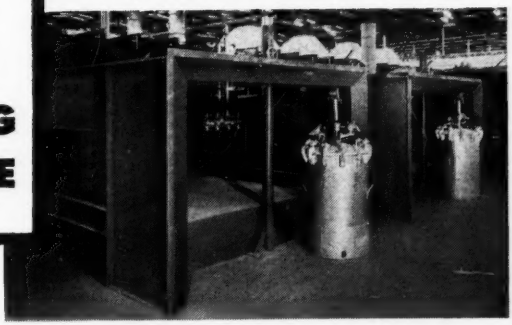

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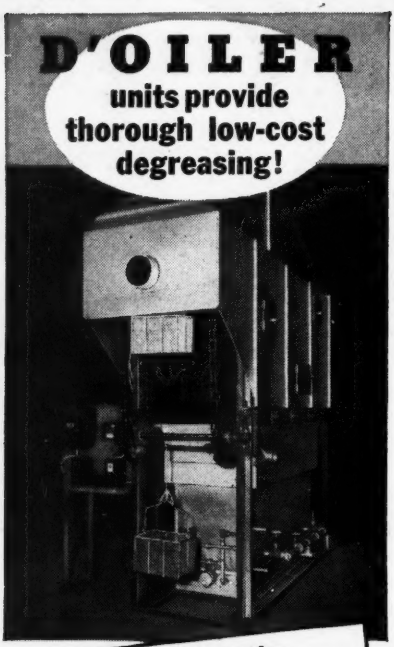

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"During the first few years these were produced exclusively in brass and nickel-silver, but it was seen that the tools and mechanical methods devised could be applied to the production of silver swivels for which there was an increasing demand. A better method other than polishing these by brush was sought, and to this end experiments were made with shaking barrels. It was thought that a horizontal motion combined with the existing rotary motion would give improved results. The first construction consisted of mounting a disc obliquely on the shaft which was guided to and fro by a pair of fixed rollers. This arrangement gave improved results, but was extremely noisy—in fact it might be assumed that a large factory in one of the heavy industries was at work in the vicinity, and to the writer's few peaceful employees, was to say the least, uncomfortable. Obviously, if the lost motion could be absorbed and the simple drive by one belt retained, it would be a considerable gain. This was accomplished in the patented action of the "Rapid" shaking machine, which apart from any noise from contents of the barrel, worked noiselessly—giving at the same time the intended side to side motion whilst permitting reduced obliquity of the cam itself. This was the mechanical side of the problem, but perfect results were not obtained until experiments led to the use of smooth steel bicycle balls, mixed with clean soap suds. Eureka! this combination was indeed "terrific," and nothing better or more effective could be hoped for.

The process was soon released to local silver chain makers who were literally overwhelmed with the transformation of their products after about 20 minutes of this burnishing process with no other preparation than the ordinary pickling after soldering the joints. The process was extended to rolled gold chains with like results. In

PITTSBURGH PLATE GLASS COMPANY

addition it was found that the thin covering of gold which was frequently removed by the ordinary brushing methods and exposed the links, in parts, to the acid test, was always burnished and the pores of the metal closed up, to the extent of rendering the chains "acid proof." This could be realized when it was also found that there was no loss in weight whatever. If 50 ounces (say of chains) were put in the burnishing barrel—50 ounces beautifully finished could be taken out.

A few machines with a description of the process were exported to the U. S. A. The Americans with their usual enterprise and resourcefulness soon had factories equipped for making balls for this process."

And here we have the reaction of the man who invented the Rapid Shaking Barrel and what happened in his first use of steel balls and soapy water. We have insisted all along that from all of the record we must accord to Mr. Henry Edmonds the honor of being the Father of Steel Ball Burnishing in the United States.

What we did here in barrels prior to 1901 must have been much the same as the practice in England. We do know that small parts which could act against each other and so be termed "self-burnishers" were operated in barrels, but it was left to the ingenuity of Henry Edmonds to seek out and secure hardened steel balls for use in his barrels, a practice that is now literally world wide in its acceptance and operation.

Now let us go back to 1899 and let us quote again from Mr. Edmonds when he says: "In addition it was found that the thin covering of gold which was frequently removed by the ordinary brushing process and exposed the links, in parts, to the acid test, was always burnished and the **pores of the metal closed up** to the extent of rendering the chains acid proof."

From the foregoing we needs must conclude that the values to be gained from a barrel finishing operation properly performed in an adequate barrel are: the cold working of the surface to provide for resistance to wear, and in this same cold working process, the closing of the always present pores in the plated surfaces to resist corrosion.

It seems rather strange that here where we have all sorts of barrels in operation, no single barrel manufacturer has ever undertaken to produce in this country a barrel of the "shaker" type. That it must have considerable merit seems to be borne out by the fact that while the first barrels of this type were first produced by Mr. Edmonds back in 1899, the production of this type of barrel and its use in England seem to have been continuous right down to the present time. It might prove interesting if some one of our more progressive barrel manufacturers here would build at least one of this type and compare its action and

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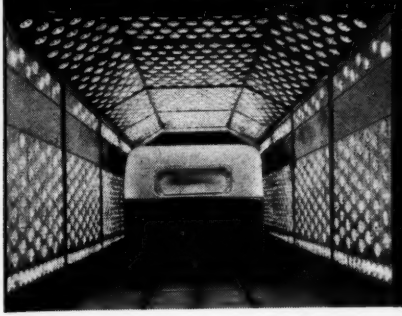

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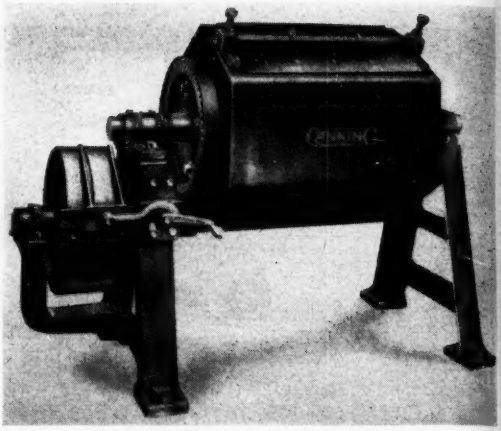
Fig. 8—Canning Barrel No. 1554



the results secured as against the regular types in general use here.

It is not to be supposed however that the "shaker" type of barrel is the only type in use in England. It would seem that their understanding of barrel finishing and its necessities are much the same as our own. In a catalog page which Sir Ernest Canning sent to us, there is illustrated two types of barrels which we are reproducing for you.

To those of you who are familiar with our leading makes of barrels, the similarity of these two barrels to those of Baird and Globe in the long and narrow type and of Abbott in the high and narrow type is readily and immediately recognized.

So long as we are on the subject of English procedure we can clarify the understanding of a material widely used in England as an abrasive medium for the reduction of surface area, which has been so used there for many many years. We had always supposed that this material which is generally termed "Scottish Pot" was a natural mineral that was crushed and separated into various sizes for barrel application but we are now told that this is untrue and that Scottish Pot is made from the broken up casting pots as used when melting metal in foundries. This is one of the beginnings of the development of barrel finishing materials and comes easily within the classification of various types of fractured minerals of various sorts now in use for this purpose. Perhaps if some enterprising supplier of barrel finishing materials could secure the rejected pots from some of our larger foundry operators, he might well devise means for crushing them and screening the products to size for use in the surface finishing of castings and forgings by the barreling process.

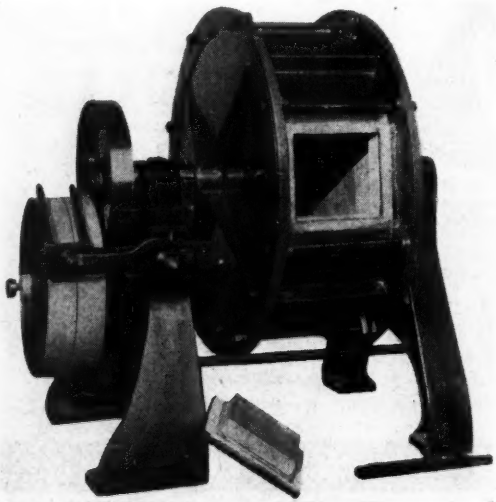


Fig. 7—Canning Barrel No. 1486

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Measurement of the Adherence of Organic Coatings to Metals

ANY organic coating when applied to a metal product must adhere well for relatively long periods of time. As a rule, evidence of poor adherence, such as flaking, peeling, and easy removal by some external force, may be so obvious as to suggest a simple cause for the loss of adherence. However, it should be remembered that these ultimate signs of loss of adherence may be the result of a number of factors. It is important to obtain a high order of initial adherence of an organic coating; yet when considered from the standpoint of durability, the retention of adherence is really more important.

In actual measurement of the adherence of an organic coating to the base metal, the results may be modified and influenced by such other characteristics of the film as its cohesion, plasticity, and brittleness. The methods for adherence measurements may be classified into five categories: (1) tensile methods; (2) scratching or gouging tests; (3) base deformation tests; (4) impact tests; and (5) miscellaneous tests. Recently Henry Green and Theresa P. Lamattina, Interchemical Corporation, have described a new method of adherence measurement based on a modified scratch test

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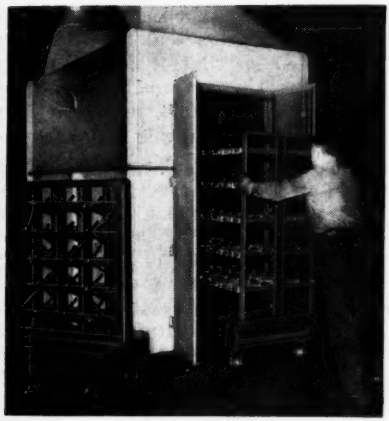

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Now, the A-F Rack Washer installed conveniently in the plant keeps plenty of clean racks available, and no special operator is required. Because of its high-pressure oscillating wash system, the A-F Rack Washer strips away every trace of stubborn grease, grinding dust and waste metal. An average of 100 racks are washed *daily* in this plant!

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(Analytical Chemistry, June, 1948). The method appears useful for both laboratory and plant work, and differs from the ordinary scratch test in that the scratch is made with a knife edge, 4 mm. wide, the result being a band and not a narrow groove, as would be made with a needle point. The work was part of a general investigation of the adhesion of organic coatings to metal surfaces, conducted by the Interchemical Research Laboratories under contract for the U. S. Navy Department, Bureau of Ships, Washington, D. C.

The adherence tester described by Green and Lamattina, shown in Fig. 1, consists of a plate, **E**, on which is fastened the metal base plate, **V**, containing the coating to be tested. By means of the motor, **A**, the plate moves in the direction of the arrow, pulling the base plate under a weighted knife edge, **G**, which is connected by means of the beam, **P**, and the wire, **Q**, to the pendulum, **L**. **E** is supported by the carriage, **F**, which is moved forward by the use of the worm screw, **C**, and the threaded supports, shown in **D**. The beam, **P**, as can be noted in the diagram previously referred to, is supported by a device, **N**, which rotates about the axis, **I**. In the operation of the test instrument, as the knife edge, **G**, moves forward with the base plate containing the coating to be tested, the pendulum weight, **M**, is raised. This produces a backward pull on the knife edge, **G**. Thus, at the moment the backward pull equals the forward thrust exerted by the coating, the knife begins to remove the coating. From then on, the knife edge and the pendulum weight, **M**, remain stationary, while the coated base metal plate continues to advance. When this condition is reached, a reading is taken of an Ames scale, **K**, which is constructed so that it has a sliding arm, **W**, resting on and activated by an eccentric, **X**. Thus, it can be seen that the scale reading is a function of the distance through which the pendulum weight, **M**, has been raised. It was pointed out by Green and Lamattina, that since the knife is on a beam pivoted at point **S**, and swings freely on the pivot, a certain pressure weight, represented in Fig. 1 as **H**, is necessary to keep the knife edge down in contact with the base plate. This produces an element of friction which must be subtracted from the original reading, and requires the running of a blank. To do this the base plate is returned to its original position and

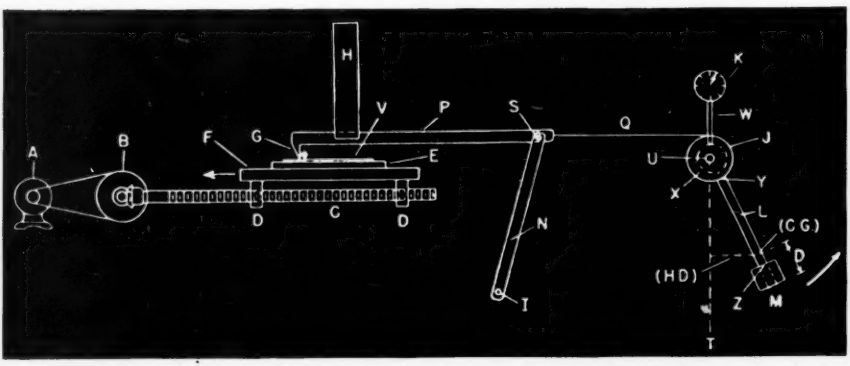

Fig. 1—Adherence tester used to measure stripping force
(*Illustration courtesy "Interchemical Review"*)

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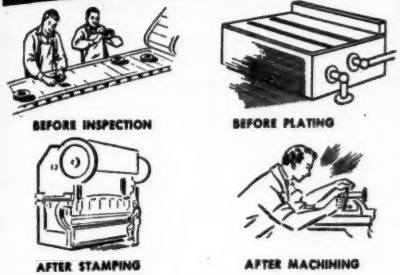

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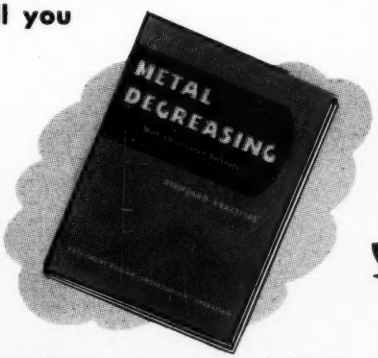

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a run is made on the base metal strip at the area previously occupied by the coating. In making the calculations, both readings are converted to dynes and the second reading is subtracted from the first. The difference in the two readings is the stripping force, which has been designated as **SF.** The stripping force is divided by the strip width to give a ratio called the stripping force per unit width. When this value is divided by the film thickness, the result is designated as the intrinsic stripping force. It has been shown that the measurements are independent of the speed at which the cut is made and

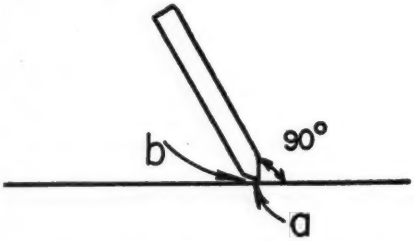

Fig. 2—Sketch illustrates shape of knife used with adhesion tester. "A" is called the "toe" and "b" is called the "heel" of the knife. The first face is placed in the tester in such a way that it makes an angle of approximately 90 degrees with the coating.
(*Illustration courtesy "Interchemical Review"*)

of the amount of friction developed by the pressure weight used in forcing the knife edge into contact with the plate. It was pointed out by Green and Lamattina that it is important to use a relatively soft knife rather than a hard steel one. The best material found for this purpose was ivory, although it was stated that hard woods could also be used with success. The knife must be harder than the coating; that is, hard enough to strip the coating, and yet sufficiently soft not to cut into the metal base plate.

The knife edge must be sharp, straight, and have no rounded corners, burrs, and nicks. The knife should be shaped as shown in Fig. 2. The first face is placed in the test instrument in such a way that it makes an angle of approximately 90 deg. with the organic coating. At this angle, it was pointed out, the vertical component of the cutting force is zero and the entire applied force is parallel to the surface of the plate.

The test plate selected for use had the size 2 x 4½ inches. The thickness of the plate was found to be immaterial, so long as it could be cut readily and retained its flatness. The cleanliness or condition of the plate surface may be whatever the tester desires to investigate.

Scratching Methods of Adhesion Testing

Some idea of adhesion may be gotten by simply scratching the film with a sharp knife. One rough quantitative method consists of making a series of cuts in the film down to the base by running a sharp knife over the surface along a straight edge. The cuts are made parallel and the distance between cuts may vary, but is generally about $\frac{1}{16}$ inch. Following this, another series of cuts are made over the first at right angles. The total number of squares is counted and also the number of damaged or undamaged squares. It will be observed that where the adhesion is very poor, practically no squares will be left intact; whereas, if the adhesion is good most of the squares will be left intact. Also, it will be observed in such a testing procedure that the spacing between lines to produce displacement of the film will be decreased as the adhesional value increases.

Sometimes tests for adherence employ a scratching method, which is applied to the coating in such a way that under a given condition of loading, the finish is just barely removed from the surface. The load, on a scratching or scraping member, at

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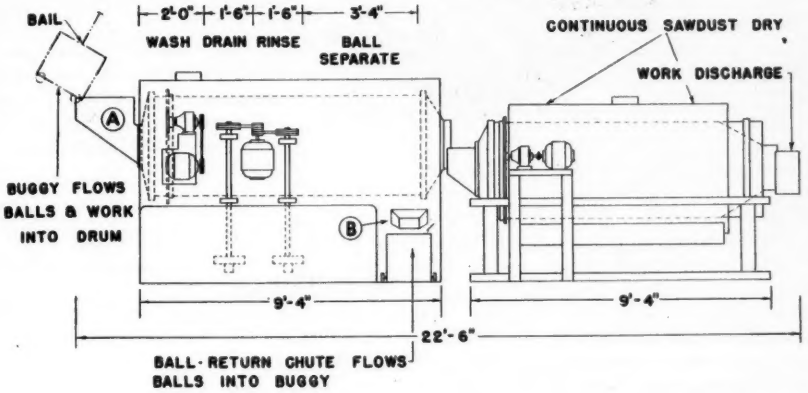

After work is ball-burnished in non-automatic barrels, the work, balls and soapy water are dumped into buggy which, in turn, is dumped into hopper of Unit No. 1 at "A". The work and balls are washed, rinsed and drained. The balls are separated and discharged into buggy at "B". The work passes from first unit through second unit, which is a Continuous Sawdust Drier, in which the work is dried in hot sawdust, which circulates, and is heated automatically within the machine. The work is automatically separated from sawdust and the sawdust never leaves the machine. A succeeding batch of work is placed in the buggy with the balls and dumped together into the next empty burnishing barrel.

This method eliminates 75 per cent of down time of burnishing barrels, partial dumping, hand riddling of balls from work, hand rinsing, heavy job of putting balls back into burnishing barrels and hand loading of work. It makes important, tangible savings in labor, floor space, floor wear, burnishing balls, sawdust and water.

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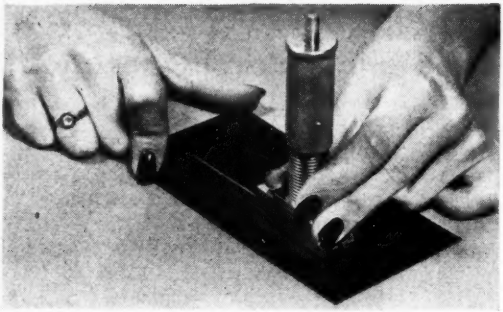

Fig. 3—One type of hand scratch adhesion tester
(Photo courtesy Bell Telephone Laboratories)

which the coating begins to be removed from the surface of the base metal, is given as the scratch adhesion. In some cases, the figure for scratch-adhesion resistance is given as the maximum load that the film can withstand without being removed from the base metal. Shown in Fig. 3 is a hand scratch adhesion tester which has been used at the Bell Telephone Laboratories.

A scratch hardness adhesion tester, known as the Microknife has been described, which employs a diamond-point cutting tool applied to the surface being tested by a lever arrangement carrying beam and weight. (See also Ind. Eng. Chem., 11, Anal. Ed., 16, 144, 1944). The load, measured in grams, is applied to the point which moves across the surface at a constant speed, and cuts repeatedly in a fixed position until the subsurface is revealed. The load on the beam and the number of strokes required to wear through the film are, thus, a measure of the scratch hardness. When used in connection with a movable platform, which can be adjusted laterally by a precision screw thread and notched wheel, the Microknife is said to be an accurate adhesion measuring instrument. In applying the instrument to this test, a standard stress is applied at progressively smaller spacings until it is sufficient to displace the coating in the area between cuts. The instrument has been applied to the measurement of the relative adhesion of coatings to various base metals and subcoatings, as well as to determining changes in adhesion caused by aging of the paint film.

Impact Tests

Impact tests, though usually of a somewhat arbitrary nature, tend to show the degree to which a coating adheres to its substrate. The effect of various surface preparations on initial adherence is clearly reflected, and changes in adherence brought about by interfacial reactions at the metal substrate are generally revealed. Tests for the determination of resistance of coatings to impact are frequently based on falling balls or hammers. In one such test that has been used at the Bell Telephone Laboratories, a loosely pivoted, round-headed hammer strikes glancing blows on the panel surface at increasing velocity, and the speed at which it hammers through to the base is noted.

The Erickson tester has been advocated for use as a test instrument for estimation of the adhesional level of an organic coating based on its behavior during deformation of the base. In the operation of this instrument, a hemispherical plunger is slowly forced down on the back of the test panel, which is supported on a firm base having a round opening beneath the plunger. This procedure is continued until rupture of the film takes place. In using impact tests in adhesional measurements it should be remembered that impact resistance is greatly affected

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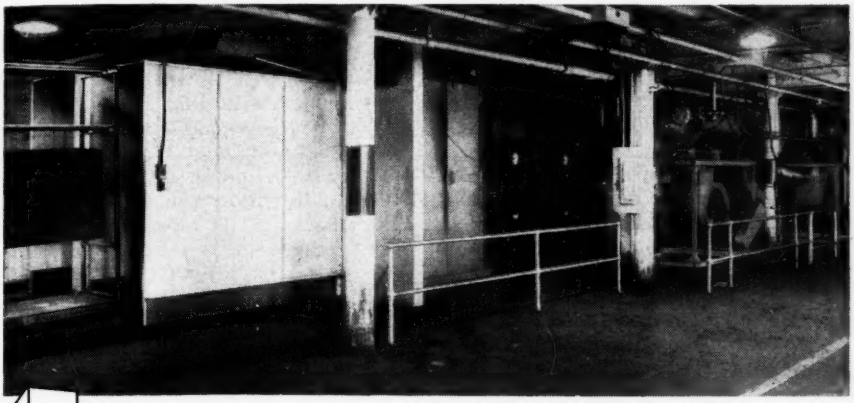

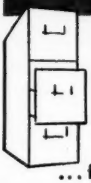

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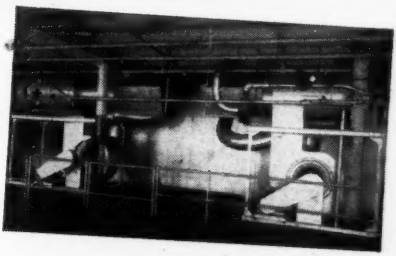

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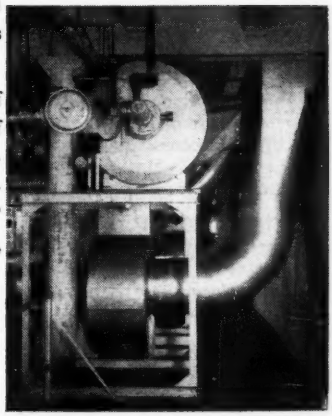

KIRK AND BLUM
INDUSTRIAL OVENS

by the toughness or brittleness of the film, as well as by its adherence to the base metal. Thus the character of the failure of an impact test must be recorded in relation to other qualities. Also, it is believed that impact resistance is quite sensitive to changes in thickness of the "cured" film.

Tensile Pull Methods

Efforts of the New York Paint and Varnish Production Club to establish a satisfactory adhesion tester led to the recommendation of a technique based on a tensile pull method. According to this method, the adhesional level is expressed as the force applied parallel to the plane of the film, which is required to strip the coating from the base. (See also National Paint, Varnish and Lacquer Association, Scientific Section, Circular 604, 1941). The painted panel is secured in one jaw of a tensile test machine, and a wooden block, secured under pressure to the paint surface with a thermoplastic cement so as to cover a standard area of film, is held in the other jaw. One modification of the technique that has been described for testing adherence of lacquers to metals uses small areas of contact and permits bonding of the two previously painted sections of the tensile specimen by the application of the same material that is being tested.

Provided reasonable care is exercised in the application of an organic coating to a metal, it should not be difficult to obtain a high order of initial adherence. The primary requirement is that the paint medium come into direct contact with the base metal. Thus, it can be seen that both the physical texture of a surface and its state of cleanliness are important in obtaining good initial adherence. Also, adherence retention is dependent on several factors, one of the most important of which is the nature of the primer coat used. One point to keep

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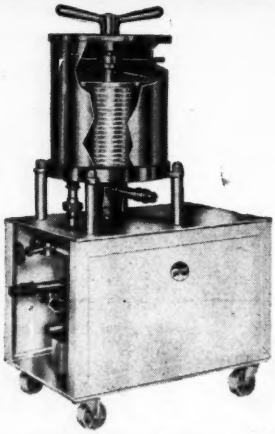

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in mind in this respect is that with a truly inhibitive pigment in a primer, the effect of moisture permeating through the coating is not as serious as it would be otherwise. From the standpoint of adherence retention, it is highly desirable to minimize the amount of moisture that may penetrate to the base metal. One of the important factors making for poor adherence of organic coatings over reactive metals is related to certain chemical reactions occurring in the coating film itself, particularly in the presence of moisture, when reaction may occur with the metal at the interface.

* * *

Electroplated Tin-Zinc Alloys and Their Uses

A FEATURE of the Annual Electrodeposition Symposium, conducted as a part of the 94th meeting of the Electrochemical Society, was a discussion of the properties and plating methods for tin-zinc alloys by J. W. Cuthbertson, Tin Research Institute, Middlesex, England. The data presented were based on experiments conducted in conjunction with R. M. Angles in the laboratories of the Tin Research Institute, and brought out the fact that an 80 per cent tin-zinc alloy is being increasingly used in England as an alternative to cadmium plate, particularly by the electrical industry in the protection of radio chasses, loudspeaker frames, valve screens, and other components. According to Cuthbertson, there appear to be many other applications where the new finish will find an outlet. Plate of approximately the 80 per cent tin-zinc composition, not less than 0.0003 inch in thickness, was described as being comparable in protective value to either cadmium or zinc plate of the same thickness, and moreover was

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stated to be extremely easy to solder.

Plating Bath Composition

In describing the plating process, Cuthbertson stated that tin and zinc can be co-deposited in all proportions from solutions containing sodium stannate, sodium hydroxide, sodium zinc cyanide, and free sodium cyanide operated at 65 deg. C., (149 deg. F.) and at a cathode current density, for still solutions, of 10-30 amp./sq. ft. utilizing alloy anodes of the same composition as the alloy to be deposited. The tin content of the solution is maintained at 30 gm./l., and the free cyanide at 17.5-20.0 gm./l. throughout, and the composition of the deposit is adjusted by varying the amounts of zinc, total cyanide, and sodium hydroxide. The most serviceable composition of the alloy deposit, as recommended by Cuthbertson, is in the range of 75-80 per cent tin. This is for applications where the maximum degree of protection is demanded and solderability, smoothness, and appearance are important considerations.

As pointed out by Cuthbertson, the solutions in use for tin-zinc plating are in reality a combination of the sodium stannate tin plating bath and the zinc cyanide plating bath, and in addition to the two metal salts the solution also contains free sodium hydroxide and free sodium cyanide. As a result there is the possibility that a number of reactions may take place. An increase in the sodium hydroxide, from a consideration of the reactions that would be expected to take place, would be anticipated to lead to a decrease in the tin content of the deposit, and this is borne out in practice, the relationship being approximately linear as is shown in Fig. 4.

If the free sodium cyanide content of the electrolyte is increased, the amount of zinc in the plate at first diminishes rapidly, but after a certain fairly critical concentration has been reached, further increase in cyanide has little influence on the composition of the deposit, as was shown graphically by Cuthbertson in Fig. 5.

It is thus apparent that a wide range of tin-zinc alloys can be de-

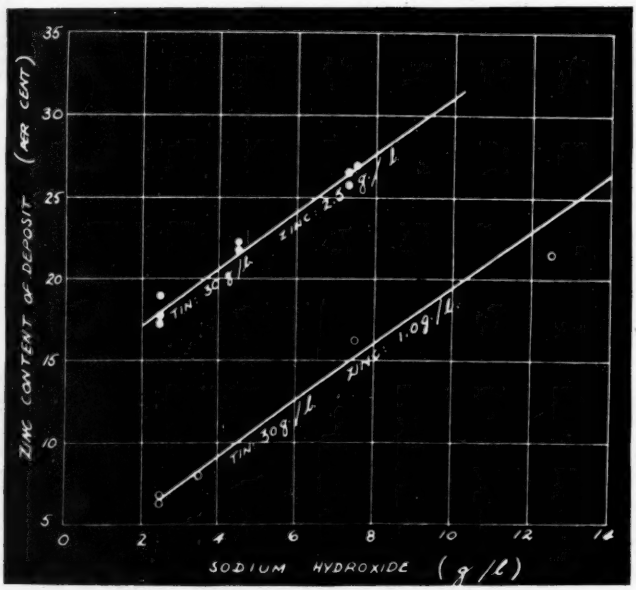

Fig. 4 — An increase in the sodium hydroxide content of the tin-zinc plating electrolyte results in a decrease in the tin content as is shown by the linear relationship in the curve. *(Illustration courtesy Tin Research Institute)*

Two 2000-lb. rack-loads of enamel-sprayed metal parts are baked every two hours by each of these four DESPATCH Ovens. Racks are either mounted on floor trucks or suspended from a monorail conveyor. Note heaters mounted on platform above each oven to save floor space.

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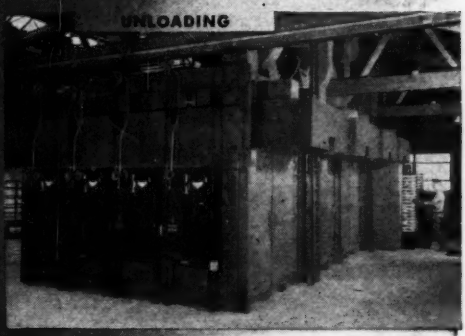

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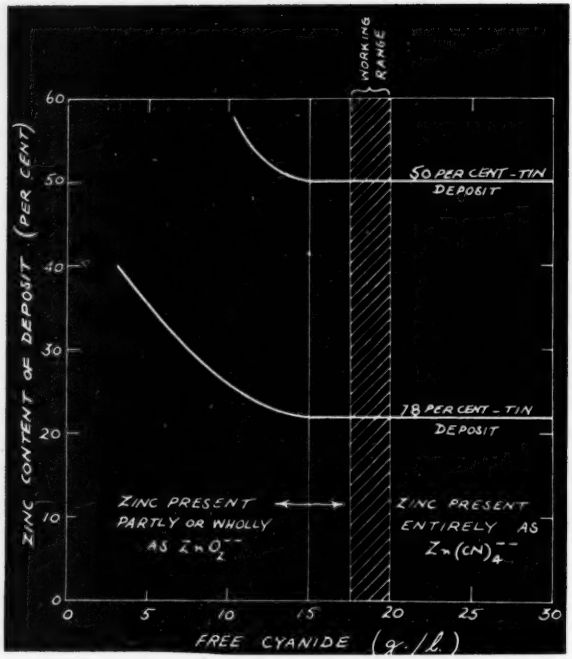

Fig. 5 — Increase in sodium cyanide concentration of the electrolyte after a certain concentration has been reached has little influence on the composition of the deposit produced from the tin-zinc plating bath. (*Illustration courtesy Tin Research Institute*)

posited from solutions containing sodium stannate, sodium zinc cyanide, sodium hydroxide, and free sodium cyanide merely by altering the proportions of these four constituents which make up the bath. However, it was pointed out by Cuthbertson that it is convenient in practice to keep the tin and free sodium cyanide contents of the bath constant, and adjust the composition of the deposit by varying the amounts of sodium zinc cyanide and sodium hydroxide.

Maintenance of the Preferred 80 Per Cent Tin-Zinc Alloy Bath

Cuthbertson showed that with properly adjusted working conditions there is not much change in the tin and zinc contents of the bath over long periods of time. The sodium hydroxide diminishes slowly and the sodium cyanide more rapidly in use; therefore it is advisable to check the amounts of these constituents daily. It is important that the temperature of the bath be maintained in the range of 65-70 deg. C. (149-158 deg. F.) in order that the consumption of cyanide will not increase above a satisfactory value.

Cuthbertson cited the case of one British firm manufacturing electrical components that installed a 750 gallon tin-zinc alloy bath to deposit the 80 per cent tin-zinc alloy plate. As a result of experience with the bath, this firm has now two additional baths of the semi-automatic type, of 750 and 1250 gallons capacity respectively, and the operation of a fourth bath is contemplated. The properties of the plate produced in this application were found to be very similar to those of cadmium plate.

Anodes

In discussing the use of anodes in the tin-zinc plating bath Cuthbertson brought out the fact that cast anodes are satisfactory and they should be of the same composition as the alloy that is to be deposited. An oval section is preferred; however, flat anodes may be used provided they do not exceed about 4 inches in width. Proper arrangements should be made to ensure

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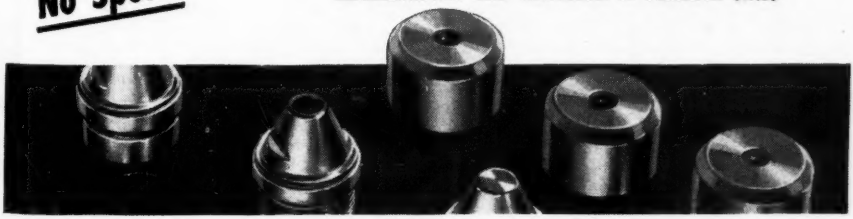

a firm contact between the anodes and the bus bars on the tank. It is important that the anodes be operated at all times in a filmed condition. In commercial installations the most convenient way of establishing the film is by raising the bath voltage for 15-30 seconds to about 2 volts above the normal working value, usually 3.5-4.5 volts. Tin-zinc anodes containing 80 per cent tin, according to the operating conditions described by Cuthbertson, will retain their film long enough to allow them to be left quiescent in the bath for at least two hours.

When plating the interior of cylindrical articles, it is sometimes impossible to provide sufficient anode area in the space available. Under these conditions it is necessary to use some insoluble anodes. It was pointed out that some success has been obtained in depositing a tin-zinc alloy plate on the interior of fire extinguisher bodies using iron anodes. Resorting to corrugated or composite anodes to increase the effective anode area was described as impractical, in view of the fact that the anodes tend to become passive on the high current density areas and to lose their film on the low current density areas.

Passivation of Tin-Zinc Alloy Plate

It was pointed out by Cuthbertson that tin-zinc plate of any composition can be passivated by treatment in a hot 2 per cent chromic acid solution which was found to increase the corrosion resistance of the plate. The thickness of the passive film and depth of coloration increase with the time of immersion and also with the temperature of the treatment. Treatment for 30 seconds at 80 deg. C. (176 deg. F.) produces a yellow or brown film, while immersion for 15 seconds at 50 deg. C. (122 deg. F.) results in a thin colorless film. The chemical surface treatment has the additional advantage of

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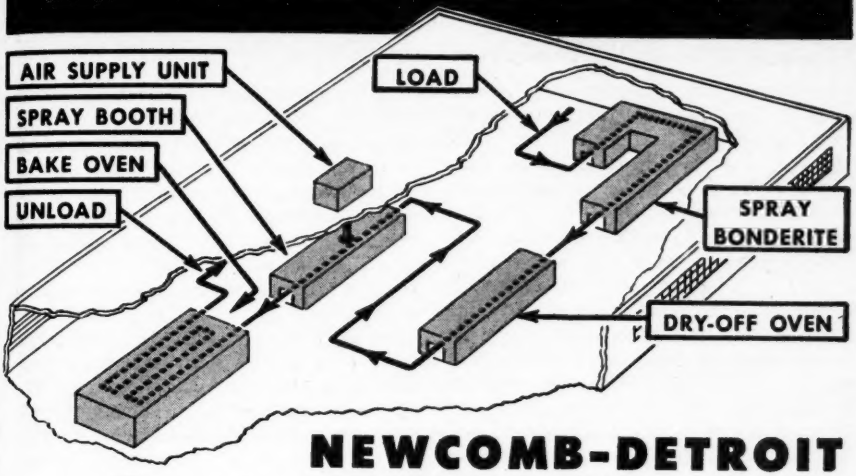

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reducing any tendency of the plate toward finger marking. In general the lower temperature treatment is preferred as it preserves the appearance of the plate and does not impair its solderability.

Properties of the Tin-Zinc Alloy Plate

In discussing the corrosion resistance of the tin-zinc alloy plate, Cuthbertson stated that humidity, salt-spray, hot-water porosity, and outdoor exposure tests have been carried out on steel specimens coated with tin-zinc deposits of various compositions and thicknesses. In every case, the optimum tin content of the deposit was found to be 75-80 per cent. With more tin, the deposits tend to resemble electrodeposited tin but are less porous; whereas with less than 50 per cent tin they become more like zinc in character. From 80 per cent down to 50 per cent tin, the corrosion resistance falls slowly but was reported to be still fairly high for the lower-tin alloy. Solderability, which was described as excellent for the 80 per cent tin alloy, deteriorates steadily with reduction in tin content.

Irrespective of composition, the thickness recommended for most applications was 0.0005 inch, with 0.001 inch being preferable for some applications. The minimum thickness should not be less than 0.0003 inch for any application. The hardness of tin-zinc plate, containing 80 per cent tin, on the Vicker scale is 37, whereas the hardness of cast tin-zinc of this composition is about 18. The greater hardness of the electrodeposited alloy was attributed mainly to its much finer structure. Tin-zinc plate is very ductile and mechanical deformation of tin-zinc plated steel by bending does not rupture the coating or seriously reduce its protective value. Being harder than tin the alloy plate can be readily polished to a high luster.

* * *

New Vehicles for Organic Surface Coatings

IN discussing some of the most significant recent developments in the organic protective coatings industry for "Chemical and Engineering News," published by the American Chemical Society, Harry Burrell, Interchemical Corporation, and C. P. Neidig, Atlantic Refining Company, placed the use of oleoresinous vehicles modified by co-polymerization with unsaturated monomers high among the recent achievements of the industry. The co-polymers thus produced have been found to differ in their properties from the parent materials. Those from drying oils with styrene or cyclopentadiene resemble varnishes, whereas the styrenated alkyds are more like lacquers. Both are supplied

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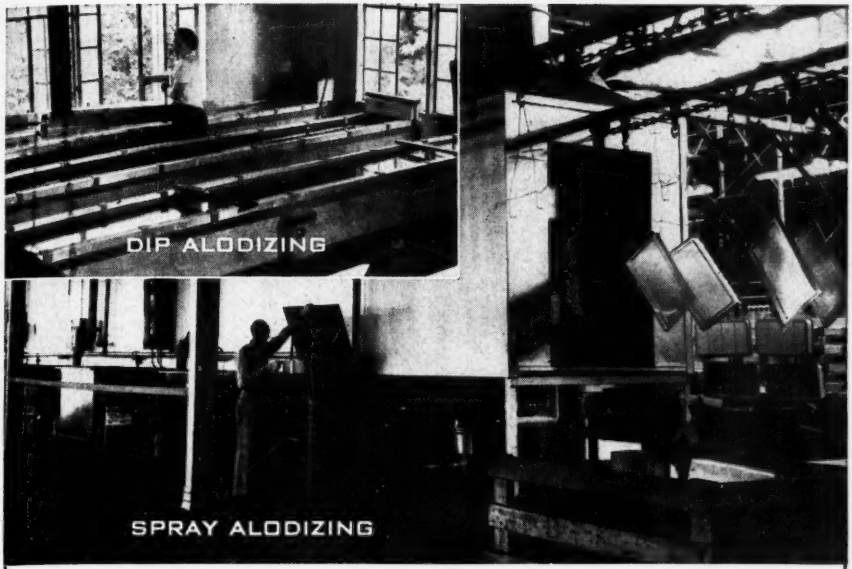

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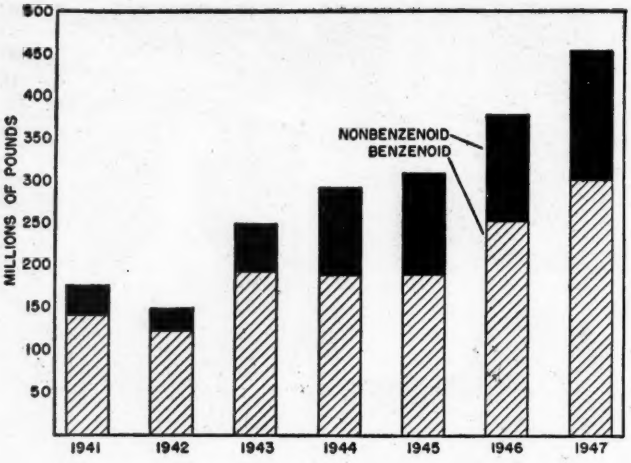

Fig. 6—Graphical representation showing the increased use of resins in protective coatings over the past few years (*Illustration courtesy "Chemical & Engineering News"*)

as solutions and, depending on the ratio and nature of the monomer, the products dry mainly as a result of solvent evaporation.

According to Burrell and Neidig's report, the drying speeds of the materials are rapid, and the films obtained are hard, tough, light in color, and have a high gloss with good apparent depth. Adhesion is generally good, as is resistance to water, alkalies and acids. There is evidence that outdoor durability tests will prove satisfactory, although additional testing must be done in certain applications to prove this point. Shortcomings of the materials include odor, deficiency of gasoline and solvent resistance, incompatibility with other film formers, and poor pigment wetting. It was also reported that some difficulty has been experienced in formulating spray coatings.

Several major producers of drying oils and alkyl resins have come out with "styrenated" materials of the above type. There has been a strong impetus to develop materials such as these, due to the availability of cheap styrene, a-methyl styrene, cyclopentadiene, and butadiene at approximately half the cost of drying oils. It was reported that the content of styrene in the new materials usually varies from 30 to 60 per cent. Production methods consist in adding the monomer, containing a relatively large amount of peroxide catalyst, slowly to the hot oil or resin. It is important to use due caution to see that a true polymer is formed because a polymer solely or largely of styrene is incompatible with the oleoresinous component. The use of blown oil improves compatibility and eliminates the necessity of using peroxide catalyst.

The production of resins for use in protective coatings has increased substantially in recent years; Fig. 6 was presented by Burrell and Neidig to bring out this point and to further emphasize that this steady growth has made the protective coatings industry a very fertile field for the introduction of new products.

Other recent developments have gone along with the production of new vehicles. Progress has been reported in adapting the silicones to the coating field by blending with cheaper hydrocarbon resin vehicles to produce a reasonably priced protective coating that will maintain good appearance and adhesion when applied to heated surfaces. A rather novel technique has recently been applied in the use of

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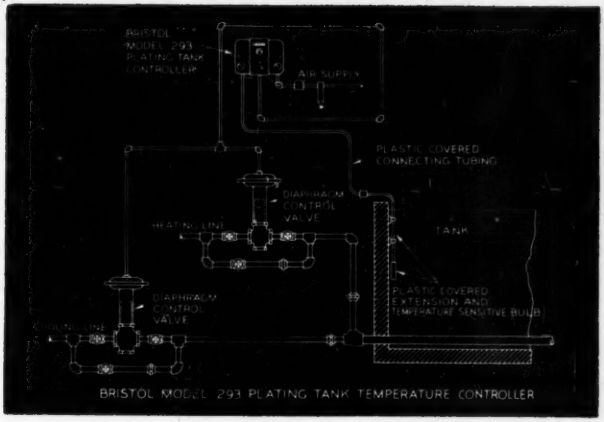

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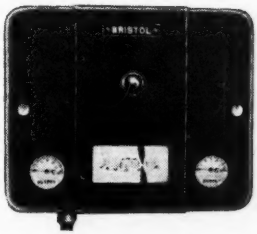

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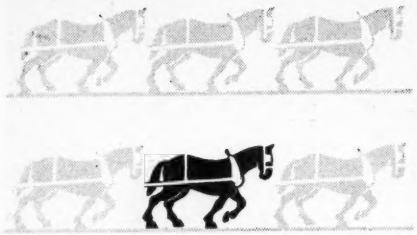

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slightly incompatible vehicles with aluminum pigment to accentuate the flooding characteristics for the purpose of making a one coat "hammered finish." Concerning fire retardant coatings, a report by workers in the Navy Department indicates that the well known antimony oxide pigment in a chlorinated base appears to offer the best protection.

* * *

Proper Maintenance of Plating Room Equipment Pays Dividends

MAINTENANCE of equipment is often one of the most neglected phases of operation in the plating department. Good dividends result from care given to all equipment in the plating room because of the nature of the processes performed and the corrosive conditions encountered. However, careless maintenance in oiling and greasing of automatic equipment may be harmful to the operation of some bright plating processes as a result of contamination.

Tanks and other equipment should be well painted as well as the duct work and structural steel. To guard against the severe corrosive atmosphere of the plating room, the special chemically resistant synthetic coating materials that have been developed in recent years are to be recommended for these painting operations. It is important to remember that tanks should have continual inspection for leaks either in solution or current. Lined steel tanks should be emptied occasionally, and the linings inspected carefully for breaks. If metal begins to deposit on a tank lining because of a break and is not removed or stopped off when first observed, it may spread over considerable area causing

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damage to the lining, as well as loss of metal and plating current.

In line with proper maintenance all exhaust ducts and equipment should be carefully washed in order to keep them in satisfactory operating condition, as well as to prolong duct life. With reference to chromium plating tanks, S. M. Martin, United Chromium, Inc., in discussing engineering of the plating room before the 35th Annual Convention of the American Electroplaters' Society suggested that it is a very simple matter to insert the nozzle of an ordinary garden hose into the exhaust slot along each side of the tank in order to wash down the chromic acid which may collect in the slot or tank casing. This practice, according to Martin, not only reclaims chromic acid but maintains satisfactory ventilation on the tank. Thus, by keeping the exhaust system clean, the velocities required will be maintained up to standard.

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WAUSAU • WISCONSIN

Maintenance of floor construction and surfacing is important especially where the plating room is located on an upper floor instead of a ground floor. Generally an open floor constructed with sufficient number of acid resisting drains, with acid resisting asphalt material protection underneath as well as on the top surface of the sub-floors, has been found to result in the least maintenance. Special brick floors must be carefully installed and maintained in order to give best service. The cement used to hold the brick must be both alkali and acid resisting, as well as waterproof and nonporous.

It should be kept in mind that any plating room floor should be regularly flushed. For this purpose a simple hose is generally to be preferred to elaborate spray pipes which in many cases have ultimately been found to give trouble from clogging. Duckboards or grilles are good for the working aisles. For proper maintenance, floor drainage or slope to drains should be at least ¼ inch per foot. Since plating room floors are usually wet with water and plating electrolytes, it is very important that all tanks be kept insulated from the floor. Non-absorbent materials, such as glass brick is one preferred material for this use, although rubber, plastics, and other material may be used. One point should be kept in mind in this connection; that is, unless specially treated, wood is not satisfactory as an insulating material since it has the tendency to absorb solutions and become a conductor.

Where pit construction, rather than the open floor type, is used to accommodate deep tanks and to give uniform working heights to all tanks, one large pit for all tanks has been found to be most satisfactory from the maintenance standpoint. It can be seen that this simplifies the pit floor drainage problem and allows more facility for

ANOTHER

MECHROME

Bulk Chromium Plating Plant

AT STRATFORD, CONNECTICUT

CAPACITY—45 TONS per day

The installation of this modern and efficient processing plant here at Stratford, Connecticut, is ready to serve you economically and productively with a capacity of 45 tons of small parts per day on

Steel - Copper - Brass - Zinc Die Castings

Parts are burnished, copper plated, nickel plated and chromium plated, or plated to specification.

The MECHROME process produces a very highly polished luster finish economically. Most work leaves our plant within 48 hours after receipt. Pick-up and delivery service within 150 miles of Stratford.

Your inquiries are invited. Call, write or telephone. Send samples or blueprints to our main office at Ferry Boulevard and Longbrook Avenue, Stratford, Connecticut.

Send for Price List for Plating Screws

CHROMIUM ENGINEERS, INC.

FERRY BOULEVARD AND LONGBROOK AVENUE

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Associate Plants in the Following Cities:

CLEVELAND, OHIO	WATERTOWN, MASS.	NEW YORK, N. Y.
CHICAGO, ILL.	DETROIT, MICH.	BROOKLYN, N. Y.
NEWARK, N. J.	CINCINNATI, OHIO	BUFFALO, N. Y.
WORCESTER, MASS.	ELYRIA, OHIO	ST. LOUIS, MO.
	LOS ANGELES, CALIF.	

• SEND ALL INQUIRIES TO PARENT PLANT IN STRATFORD, CONNECTICUT •

rearrangement of equipment if required. Individual pits or individual drain lines from tank overflow lines have been found to result in excessive maintenance difficulties. In cases where special drain pipe lines are needed it is important that these lines be installed so that they are readily accessible for clean-out purposes.

Maintenance of Barrel Plating Equipment

As pointed out by R. B. Saltonstall, Udylite Corporation, as a part of a general discussion of maintenance in the plating room in a recent issue of "Plating," published by the American Electroplaters' Society, few pieces of equipment in the plating shop must withstand the abuse to which the average plating barrel is subjected. The alkaline solutions so widely used in barrel plating operations attack the grease and lubrication of the bearings, making frequent lubrication necessary.

Get your copy

Outlines the plating techniques used today, explains the Fundamentals and Advantages of Filtration for all types of solutions and installations. Write for your copy today.

ALSOP ENGINEERING CORP.
404 KEEN ST., MILLDALE, CONNECTICUT

One lubrication schedule that was suggested is that if the equipment is operated 8 hours a day, all bearings supplied with grease fittings should be lubricated once a week, with more continuous operation demanding proportionately more frequent lubrication. A graphite grease such as Dixon's No. 3 has been found satisfactory. Motor and gear reducers should also be lubricated regularly.

Cathode contacts making the electrical connection between the negative side of the circuit and the work should be cleaned frequently. One practice that is followed is to remove them from the barrel and pound the accumulated metal off with a hammer. This generally works if they are well designed and have not been used too long without cleaning. Other parts of the equipment such as anode rods, saddles, and horns should be kept clean to ensure efficient operation and good electrical contact. Regular checks should be made on the insulation of barrel tanks from the floor and from possible conductors. Moist salts if allowed to collect around and over insulators lead to current leaks and in some cases to severe corrosion of conductors.

Titanium is a low-density, silver-white metal, between silver metal and stainless steel in color. In ductile form it possesses an excellent strength-weight ratio and good corrosion-resistant properties.

This means that in comparison with such common metals and alloys as iron, copper, steel, and brass it is relatively light, and for any given purpose it takes less of titanium than of any of the other commonly used metals to get the same strength. Also, tests have shown that, without protection, its resistance to corrosion by salt water and atmosphere is excellent and that it withstands the effects of most chemicals better than most other structural metals.

NEW!

BLACOSOLV

Highest stabilized degreasing solvent

—Stabilized NOT Alkalized

Years of research and development have produced this outstanding new BLACOSOLV. This new product has been subjected to the most rigorous stability tests for the most difficult jobs. Contains no alkaline materials which neutralize acid *after* breakdown. The new stabilizers *prevent* solvent breakdown and possible acid formation.

The new BLACOSOLV will degrease scientifically all metals or combinations of metals. You need not pay premium prices for special solvents for different metals. Blacosolv can be used over and over without impairing its high qualities.

G. S. BLAKESLEE & CO.

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METAL PARTS WASHERS

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NEW YORK, N. Y. TORONTO, ONT.

NEWS of the Industry

NEW PLANTS

In order to produce the improved "Tac" Rag, which is non-inflammable, the **DETRO MANUFACTURING & SALES CO., INC.,** 3429 Wesley St., Culver City, Calif., recently erected a new, modern plant equipped with automatic machinery of its own design. Patents are pending on the product, the manufacturing process and equipment.

Production began March 7 at the former Plancor plant No. 80 at Bristol, Pennsylvania, which was purchased by the **MINNESOTA MINING & MANUFACTURING CO.,** St. Paul, Minn., from the War Assets Administration last summer. Manager of the unit is Robert N. Wolfe.

Production of adhesives and coatings is now in progress at the plant, and other lines, including some adhesive tapes, will go into production about May 1, according to an announcement by C. B. Sampair, 3M vice president in charge of production.

COMPANIES

More than 75 sales and service representatives of **THE UDYLITE CORPORATION** met recently in Detroit, Michigan, for the Annual Sales Meeting, which was conducted by L. V. Nagle, vice president in charge of sales. L. K. Lindahl, president, opened the convention with a speech of welcome in which he thanked the organization heartily for an outstanding record in 1948.

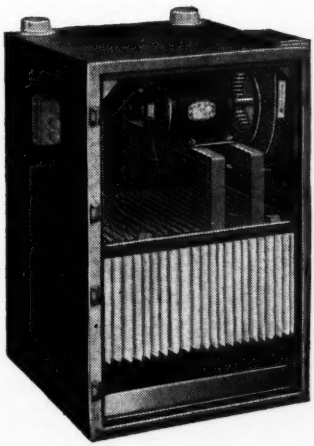
Mr. Nagle announced at the meeting that 1948 represented the greatest year in Udylite history, and with new products and other developments he expected 1949 to show a substantial increase over 1948.

THE PENNSYLVANIA SALT MANUFACTURING CO., Widener Bldg., Philadelphia 7, Pa., has announced the opening of a new district sales office in Appleton, Wisconsin, for its Heavy Chemicals Division. C. H. Anderson, of Pennsalt's Chicago office, has been placed in charge as district sales manager.

Th Udylite Barber Shop Chorus entertains sales and service representatives.

Keep your eye on production figures by eliminating abrasive dusts with

TORIT DUST COLLECTORS



TORIT Dust Collectors range in size from ⅓ HP to 3 HP. Completely self-contained they are designed to filter and recirculate dust laden air from single, or compact groups of cut-off, polishing and grinding machines. They require no extensive piping, and their compact design permits fitting into crowded production layouts.

TORIT Dust Collectors are economical. Compactness reduces power requirements and they turn on and off with the machines. They are easy to clean and ruggedly built for long life. For details and the latest TORIT catalog write:

TORIT MANUFACTURING CO.

314 Walnut Street St. Paul 2, Minn.

E. F. HOUGHTON & COMPANY, manufacturer of industrial chemicals, oils, and leathers, recently held a family week Open House program at its modern office building located at 303 W. Lehigh Ave., Philadelphia. Pennsylvania.

The visitors inspected an entire floor of exhibits featuring Houghton products and the finished products of leading Philadelphia industries using Houghton materials.

One of the most popular exhibits was the printing press that turned out, in 1908, 2500 copies of the original "Houghton Line," the tenth oldest industrial house publication in the country.

Recently the **CAMBRIDGE WIRE CLOTH COMPANY,** manufacturer of woven wire conveyor belting, industrial wire cloth, special wire fabrications, and Cambri-Wedge wire screening, held its annual sales meeting at the company's home office in Cambridge, Maryland. The meeting was attended by Cambridge representatives from the entire nation.

The week's sessions were highlighted by discussions of product application in the many fields in which Cambridge products are used.

The accompanying photograph was taken at the opening session.

Two newly developed devices, among a total of 16 outstanding electronic and other automatic industrial instrument displays, will be exhibited by **BROWN INSTRUMENTS DIVISION** of the **MINNEAPOLIS-HONEYWELL REGULATOR CO.,** Philadelphia, Pa., at the Western Metals Congress and Exposition to be held April 11 to 15 at Los Angeles.

The newest Brown developments are a strip chart proportioning electronic recorder-controller with a new proportioning relay, and the company's Protectoglo which combines a flame-type electrode for coal or gas or both.

By arrangement with **SAM TOUR & CO., INC.,** 44 Trinity Place, New York 6, N. Y., metallurgists, engineers, and consultants, an out-of-doors testing sta-

(Left to right) Burton F. Davis, Emery Advertising Corp.; Lee Mowbray, in charge of wire fabrication activities; H. W. Byer, Pittsburgh; H. E. Claycombe, Chicago; J. C. Peters, New York; L. F. Moody, San Francisco; E. M. Evans, secretary-treasurer; I. F. Pink, vice president; F. L. Hooper, assistant to the president; C. E. Shuman, Houston; Ernest Learned, Boston; F. L. Stevenson, Detroit; J. B. Hanson, Baltimore; H. E. Pink, in charge of wire cloth operations; E. N. Adams, advertising manager

BEHRLON finishes

Like this rich-looking jewel box, your product can pick up something extra in appearance that means more sales. You can do it with BEHRLON, the micro-cut rayon flock finish that's sprayed on like lacquer. It's soft, colorful and inexpensive and it's practical for wood, metal and plastic surfaces of all kinds.

We'll be glad to show you just how well BEHRLON will go on your product. Write us about this *free* demonstration. Send too, for the new BEHRLON color swatch card.

BEHR-MANNING

BEHR-MANNING · TROY, N.Y.

(DIVISION OF NORTON COMPANY)

tion is available in Miami, Florida, which provides the maximum of exposure to the sun's rays for weather testing of materials and products.

At the Tour laboratories in New York facilities are maintained for both outside and inside weather testing. Outside testing racks are set up on the roof, and in the laboratory simulated weather conditions are secured by up-to-date equipment.

To commemorate its 40th anniversary, **OAKITE PRODUCTS, INC.**, 20 Thames St., New York 17, N. Y., has compiled a special issue of the "Oakite News Service." The 40-page booklet takes only a brief look at the past and then goes on to outline the scope of Oakite Service and to picture the contributions of that service to today's production tasks.

FLUREY PRODUCTS CORP., Suite 3500, 450 Seventh Ave., New York 1, N. Y., has recently been organized by Robert Corey and Benjamin S. Flug, both

Robert Corey (left), Benjamin S. Flug

previously associated with the Bart-Messing Corporation, to engage in the sale of a complete line of products for the polishing and plating trades. The company is equipped to render complete plating plant layout and engineering service.

According to a recent announcement, **ELGIN SOFTENER CORP.**, Elgin, Ill.,

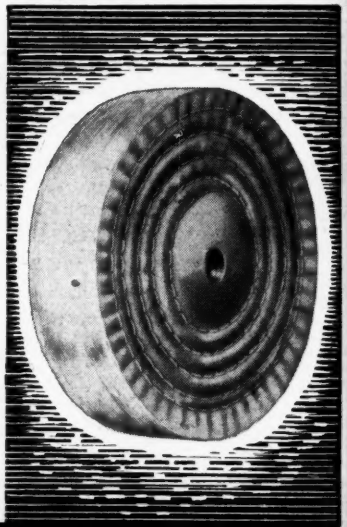
SCHOTCO Buffs

MANUFACTURED FOR 31 YEARS

√ ALL TYPES, TO ANY SPECIFICATION
√ BEST MATERIALS
√ PROMPT SERVICE

Thirty-one years' experience manufacturing Buffs for hundreds of users makes our "know how" an assurance guaranteeing a satisfactory product.

We are happy to help you lick your buffing problems. Our capacity is large enough to handle the largest requirements.

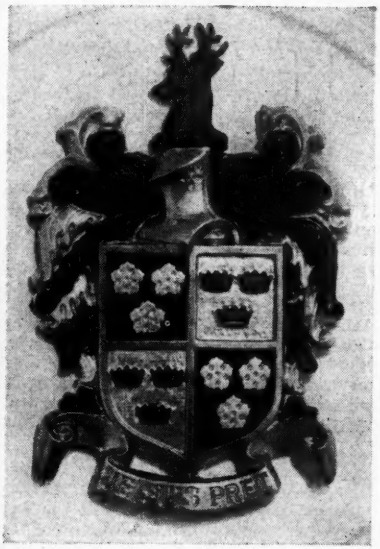


THE SCHOTT BROS. CO., INC.
WEST SALEM, OHIO, U. S. A.

CUT YOUR SPRAY PAINTING COSTS

and

SPEED-UP PRODUCTION



by using

ELECTRO-FORMED METAL MASKS

Made By Patented Process

One color after another can be wet painted before baking on many concave, convex or irregularly shaped three-dimensional metal or plastic parts.

Clean, sharply defined letters and decorative effects are obtained on intricately designed emblems, nameplates, automobile and radio dials, hub caps, horn buttons, household appliance utility markings, toys, etc.

A thin, yet strong, lip of metal, which fits accurately into the edge of the debossed areas, eliminates fogging at the edge of the paint line, and avoids after-wiping or buffing off of overspray.

The "loose" inside of letters and numerals, such as "o" and "6" are held in position by arched bridging to effect perfect characters without the use of the objectionable "ties" necessary with common stencils.

Can be fitted to fixtures on production lines. Used on hundreds of nationally known products.

Send Coupon Today

CONFORMING MATRIX CORPORATION

356 TOLEDO FACTORIES BLDG. TOLEDO 2, OHIO

I am interested in your metal masking shields. Please send without obligation:
☐ Further information. ☐ Quotation on masks for parts (or Prints) which I am forwarding.

Name.....

Firm.....

Street.....

City..... State.....

and the **ILLINOIS WATER TREATMENT CO.**, Rockford, Ill., have joined forces. Under the new setup, each company will maintain its name identity and personnel.

The management states that through consolidation of manufacturing operations production economies are being accomplished which can be passed on to the user. An important part of the plan is an integration program which will greatly broaden the scope of services available through a nation-wide organization of sales engineers and technical field men with offices in 40 principal cities, which will permit close personal attention to be given all phases of water conditioning, including special ion-exchange problems.

The Elgin company has established a Manufacturers' Division to make available its improved techniques to other manufacturers in the industry. Zeolite is also being made available through Elgin's recent acquisition, Arizona Minerals Corp., Yuma, Arizona.

NEW POSITIONS

The American-Marietta Co., Chicago, Ill., has announced the appointments of **DAVID E. EICHELBERGER** as president and **DOUGLAS E. BRYANT** as manager of its subsidiary, Leon Finch Ltd., Los Angeles. Mr. Eichelberger succeeds Leon Finch who recently retired.

David E. Eichelberger (left), Douglas E. Bryant

In addition to his new duties, Mr. Eichelberger, as vice president of American-Marietta, will continue to direct the operations of all its Pacific Coast divisions.

According to an announcement by A. D. Duncan, vice president, **Z. G. PECK** has been appointed regional director of

Z. G. Peck (left), Herman F. Winger

The Glidden Company's Pacific Coast Paint and Varnish Division. He has served Glidden in various important capacities since 1920 and has been regional director of the company's Adams & Elting Division in Chicago for 16 years.

Mr. Peck succeeds Earl L. Ehrke, who has been named supervisor of industrial sales for the Pacific Coast. Mr. Ehrke, a graduate chemist, has served Glidden in Cleveland and San Francisco since 1922.

HERMAN F. WINGER, who became associated with Glidden in 1933, has been appointed acting regional director of the Adams & Elting Division, replacing Mr. Peck. Mr. Winger has had wide experience in that division, both as a salesman and as division sales manager.

George L. Wirtz, president of the Atlas Mineral Products Co., Mertztown, Pa., has announced that **RAYMOND B. SEYMOUR,** formerly chief chemist, has returned as executive vice president and general manager. One of his assignments will be the direction of research toward the improvement and development of new protective coatings, linings, and cements.

In addition to his previous position as chief chemist at Atlas, Dr. Seymour has been associated with the Goodyear Tire and Rubber Company, Monsanto Chemical Company, Industrial Research Institute of the University of Chattanooga, and Johnson & Johnson. He is a licensed engineer and the author of numerous publications and patents.

Air Tumbler

THE MASTER OF DUST IN INDUSTRY

This picture shows what can be and is being done with the AIR-TUMBLER, a Wet Dust Collector which wets the dust but not the air. This ventilating system could be so designed because of the AIR-TUMBLER'S

MAXIMUM EFFICIENCY, (The dust-free air is fully recirculated and discharged directly above the heads of the men working on the four grinding benches served by the AIR-TUMBLER.)

AND MINIMUM HUMIDIFYING ACTION. (The returned air is so slightly humidified that the men can work in its direct path without being chilled.)

In addition, the AIR-TUMBLER is serving management by economy in power consumption and by savings in heating and maintenance costs.

Write for explanatory booklet.

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DUST SUPPRESSION & ENGINEERING CO.
LAKE ORION • MICHIGAN

Four new members have been added to the Research and Development Laboratories' staff of the Pemco Corp., Baltimore 24, Md., according to an announcement by Dr. G. H. Spencer-Strong, vice president and director of research. They are: **NORMAN BOUDER,** research in glass colors; **HOWARD F. SMALLEY,** enamel research section; **ROBERT CARPENDER,** inorganic colors; and **MELVIN J. FABY,** chemist.

L. O. Koven & Brother, Inc., Jersey City, N. J., manufacturer of boilers, tanks, special process equipment and weldments, has announced the appointment of **H. W. MacINTOSH** as treasurer of the company.

Mr. MacIntosh has been in charge of Purchasing and Stores Control for the past 29 years and will continue these activities in addition to his new duties. He is a past president of the New York Association of Purchasing Agents; a past vice president of the National Association of Purchasing Agents, District No. 8; and a member of the Henricks Club, whose membership consists of past officers of the Association.

HOLLAND SAYS:
START SAVING BY INCREASING PRODUCTION
Spray Booth — Leg and Floor Type. Available in all sizes.
Write for FREE folder "M" showing our wide selection of metal finishing equipment.
J. HOLLAND & SONS, INC.
MANUFACTURERS • DEALERS
276 SOUTH NINTH ST. • BROOKLYN, N.Y.

Behr - Manning Corp., Troy, N. Y., has announced the appointment of **JOHN M. COOK,** manager of the Abrasives Sales Division, to the board of directors of the company.

Mr. Cook joined the firm as a salesman in 1921 and was made general trades manager ten years later. He was advanced to his present position last year.

John M. Cook

Metalwash Machinery Corp., Irvington 11, N. J., has announced that **WEBB L. NIMICK** will be in charge of its new Michigan office which is located at 6432 Cass Avenue, Detroit.

Mr. Nimick will represent Metalwash in the State of Michigan and will be available for consultation and information regarding all types of metal cleaning equipment.

Elliott S. Phillips, president of Devoe & Raynolds Co., Inc., New York 17, N. Y., has announced that **A. W. BORNHAUSER** has been elected president of the Jones-Dabney Co., Louisville, Ky., a division of Devoe & Raynolds.

Mr. Bornhauser is a native of Louisville and was among the first Jones-Dabney employees, starting in 1919.

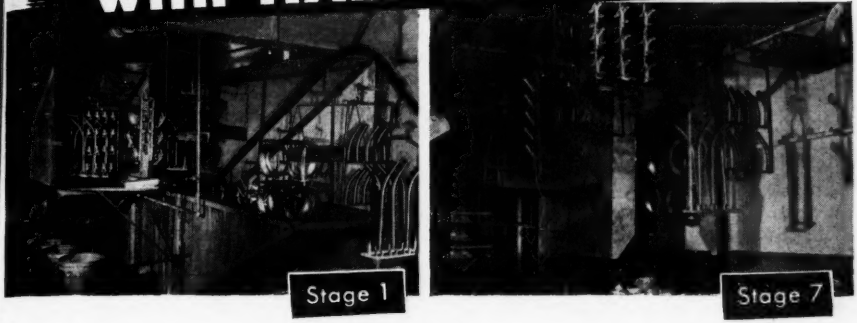
WILLIAM C. DABNEY, a director and senior vice president of Devoe & Raynolds, has been elected chairman of the board of the Jones-Dabney Company and has been placed in charge of all company plans, as well as all of its research and development activities.

RENSHAW SMITH, JR., a director and vice president of Devoe, will supervise the sales personnel and policies of the Devoe and Wadsworth, Howland paint divisions of the company.

CLARENCE W. SLOCUM, a director, has been elected a vice president of Devoe in charge of the Eastern Industrial, Marine, and Railroad Division.

WILLIAM J. NEVIN, advertising and sales promotion manager, will supervise all advertising and sales promotion for Devoe and Wadsworth, Howland, including Stores Division.

DOUBLE Your Output with HALF the Labor



THIS multi-stage, special Magnus cleaning machine was designed to handle the 412 parts of a famous vacuum cleaner, replacing hand cleaning operations which required eight men. The machine, with four men, turns out twice as much work. Cleaning that used to take 1¾ hours is done in five minutes!

Parts go through the machine on an overhead conveyor. In Stage 1 they are precleaned in Magnusol (the Emulso-Dip Process). Stage 2 drains the parts. At Stage 3, a 40 lb. cold water spray knocks off loosened dirt, grease and oil, readying the parts for spray washing with a mild Magnus alkaline cleaner in Stage 4. Stage 5 provides a hot water spray rinse, followed by Stage 6, a cold air blast to remove clinging water particles. Stage 7 is final drying at 200° F. Parts are then ready for finishing.

The Magnus line of metal cleaning machines includes both standard batch units and specially designed machines to fit into your production line.

MAGNUS CHEMICAL COMPANY • 208 South Ave., Garwood, N. J.

In Canada—Magnus Chemicals, Ltd., 4040 Rue Masson, Montreal 36, Que.

Service representatives in principal cities

IN METAL CLEANING IT'S

Magnus

CLEANERS • EQUIPMENT • METHODS

Richard Mee

In line with its program of augmenting its sales force with highly trained technical representatives, **RICHARD MEE**, St. Paul, Minn., has been appointed to represent the **Midland** Industrial Finishes Co., Waukegan, Ill., in the Minnesota territory, according to an announcement by E. O. Robson, president.

Mr. Mee's background of 18 years in the field of industrial finishes makes him well qualified for this position.

According to a recent announcement by George W. Ullman, president of the Sun Chemical Corporation, **JOHN F. DEVINE** has been elected a vice president of the corporation.

Mr. Devine will be an aide to the general managers of all the divisions with respect to sales, and will continue to supervise the operation of Sun's General Printing Ink Company—Pacific Coast Division.

DR. GEORGE E. LINDEMULDER has been appointed to head the resin and varnish research of the Grand Rapids Varnish Corporation, according to an announcement by Wayne R. Fuller, director of research.

Since receiving a Ph.D. degree from the University of Michigan in 1934, Dr. Lindemulder has held responsible research positions with three nationally known manufacturers of industrial finishes. His work has been mainly in the field of synthetic resins, varnishes, and related products.

The appointment of **DR. C. FRED GURNHAM** as chairman of the Department of Chemical Engineering in the Tufts School of Engineering has been announced by the trustees of Tufts College.

A graduate of Yale University with the degree of bachelor of science in chemical engineering, Dr. Gurnham holds a masters degree and a doctor of engineering science degree in chemical engineering from New York University. He is a licensed engineer in New York State, New Jersey, and Connecticut.

A native of Ludlow, Massachusetts, Dr. Gurnham held a number of professional appointments with American manufacturing companies before coming to Tufts College, and most recently has been conducting his own consulting engineering practice in New Haven, Connecticut, a practice which he is still continuing.

The Ceilcote Co., Cleveland, Ohio, corrosion proofing specialist, has appointed **LEO E. GATZEK** as district manager for the Chicago territory, including Illinois, Wisconsin, Missouri, and western Indiana.

Mr. Gatzek formerly was with the manufacturing research division of the International Harvester Company. His background is almost entirely in the field of engineering and he is a licensed professional engineer in Michigan.

DR. HENRY O. FARR has been appointed production and technical director of the Murphy Paint Company, Limited, a Canadian affiliate of the Pittsburgh Plate Glass Company, according to an announcement by Harry W. Thorp, president of the Canadian firm.

Dr. Henry O. Farr

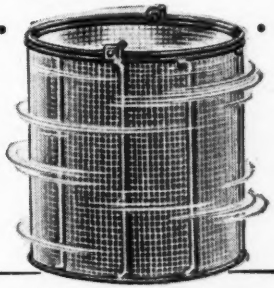
In his new position Dr. Farr will make his headquarters in the executive offices of the company, Dominion Square Building, Montreal, and will have full responsibility for the manufacturing and technical operations of the company's four manufacturing plants in Montreal, Toronto, Windsor, and Vancouver.

According to a recent announcement by the Hercules Powder Co., Wilmington, Del., **PAUL LEFEBVRE** has become district manager of the Synthetics Depart-

PAYS FOR ITSELF... IN TIME SAVED

Kreider Dryer with auxiliary steam heating unit (illustrated). Auxiliary natural gas heating unit available; also standard model without auxiliary heating.

Basket (below). Heavy gauge woven steel mesh over steel frame. Capacity, 1140 cu. ins.



Spin-Dries* up to 50 pounds in less than 2 minutes

Saves drying time. Kreider Dryer operates on ¾ h.p. at 625 r.p.m. . . . cuts drying time to as little as 35 secs.—no more than 2 mins.—for each 50 lbs.

Saves production time. Runs at top speed with maximum load, hour after hour, day after day. Ends drying "bottle necks". . . assures smooth, evenly dried surfaces, longer lasting lustre—fewer "rejects."

Saves maintenance time. Simple, sturdy construction reduces "time-outs" for repairs and servicing to a minimum. Assures long life.

See for yourself! Write Department PF-49 today for illustrated 4-page folder . . . also addresses of installations near you.

New Holland Machine Co., New Holland, Pa.

***Only 2 simple steps required...**

(1) Operator places wire mesh basketful of small parts in Dryer . . . turns motor "ON."

(2) Operator turns motor "OFF" . . . presses foot brake . . . removes basket.

NEW HOLLAND *KREIDER* DRYER

ment's New York office.

Mr. Lefebvre was Chicago district manager from 1944 to June 1948.

David C. Patrick

Appointment of **DAVID C. PATRICK as personnel** manager of W. P. Fuller & Co., San Francisco, Calif., has been announced by A. H. Brawner, president.

Mr. Patrick has been with the firm for the past 12 years and recently served as a special assistant to the president on personnel matters. Previously he was manager of the Technical Service Department.

With the retirement of O. N. Stevens as operating vice president of the Southern Alkali Corporation, jointly owned by the Pittsburgh Plate Glass Company and the American Cyanamid Corporation, several management changes have been announced by Harold F. Pitcairn, president.

STANLEY J. HULTMAN has been named works manager at Corpus Christi and **CHARLES E. WEEKS,** assistant works manager.

Appointments at Lake Charles include: **C. K. BALLARD,** plant superintendent; **ALVIN T. RAETZSCH,** superintendent of operations; **FRANK W. WOODMAN,** superintendent of engineering; and **RUSSELL S. CLARK,** divisional power engineer. In addition, Mr. Clark will serve as power engineer consultant to the Southern Alkali Corporation and to the Columbia Chemical Division of Pittsburgh Plate Glass Company.

Binks Manufacturing Co., Chicago 12, Ill., manufacturer of industrial spray finishing equipment and systems, has announced the following appointments in its sales organization:

H. J. FINK will direct sales and service in Colorado, Kansas, Nebraska, Wyoming, Montana, and New Mexico, from headquarters at 346 Grant St., Longmont, Colo., a Denver suburb.

C. J. ROOD has been made manager of the company's Indiana sales and service branch office at 117 E. Michigan St., Indianapolis, Indiana.

M. B. SCULLY will handle sales and service in northern Illinois and the State of Iowa from his headquarters at 1028 S. Euclid Ave., Princeton, Illinois.

E. J. CREMER has been appointed to handle sales and service in southern Illinois and the State of Missouri. He will have his office at 705 Olive St., St. Louis.

B. R. FULTON will be in charge of Binks' new and enlarged direct factory sales and service branch for the Ohio territory at 11231 W. Ninth St., Cleveland.

J. J. LYNCH, for many years a Binks' sales engineer, has organized the Bay State Equipment Company, with offices and warehouses at 175 Walnut St., Springfield, Mass., and 116 Bedford St., Boston. He will be in charge of all sales and service throughout the entire New England and greater Boston area.

HARVEY J. DUENO has been appointed manager of the Company's direct factory sales and service branch, 1123 N. Jackson St., Milwaukee, Wis. He will be responsible for sales throughout Wisconsin, peninsular Michigan, Minnesota, North and South Dakota.

CORRECTION

E. B. Bradshaw

The announcement concerning **E. B. BRADSHAW** printed on Page 102 of our March issue was in error. Mr. Bradshaw is not connected with the Lafayette Division, Egyptian Lacquer Manufacturing Company, as the announcement stated, but has been named as general plant manager of the Eastern Region, following the transfer of Nils Bolin to the Lafayette Division of the company as manager of that division.

HONORS

MAJOR A. E. CARPENTER, president of E. F. Houghton & Co., Philadelphia, Pa., celebrated his 45th anniversary with the company recently.

SALES REPRESENTATIVES

ALBANY, New York • Jaaro Specialties, Inc.
ATLANTA, 3, Georgia • Thermal Engineering Company
BINGHAMTON, New York • Dudley W. Gregg
BIRMINGHAM 3, Alabama • Associated Engineers
BOSTON 14, Massachusetts • Braman, Dow & Company
BUFFALO 2, New York • Landers Engineering Company
CHARLESTON 24, W. Va. • Engineering Products Co.
CHATTANOOGA 2, Tennessee • Robbins & Bohr
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CLEVELAND 15, Ohio • Russell V. Faulks Company
COLUMBUS 15, Ohio • Russell R. Gannon Company
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GRAND RAPIDS, Michigan • Rex F. Rorabacher
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HOUSTON 1, Texas • Ralph B. Johnson Company
INDIANAPOLIS, Indiana • Colby Equipment Company
JOHNSON CITY, Tennessee • Eustis Lancaster Associates
KANSAS CITY, Missouri • Smith Steam Specialty Company
KNOXVILLE, Tennessee • Eustis Lancaster Associates
LITTLE ROCK, Arkansas • Mullins Engineering Company
LOUISVILLE, Kentucky • Russell R. Gannon Company
MEMPHIS, Tennessee • J. B. Lammons
MILWAUKEE 11, Wis. • Air Handling & Specialty Company
MINNEAPOLIS, Minnesota • Uhl Company
NEW ORLEANS 16, Louisiana • Cressy Sales Company
NEW YORK CITY 17, New York • A. S. Granzen
NORFOLK 10, Virginia • Laurence Trant & Company
OMAHA 8, Nebraska • Natkin & Company
PHILADELPHIA 26, Pennsylvania • A. G. Mutimer
PITTSBURGH, Pennsylvania • William M. Bailey Co.
PORTLAND 4, Oregon • Carl L. Walker
RENO, Nevada • Charles Thompson
ROCHESTER, New York • R. K. Kohr
ROCKFORD 3, Ill. • Industrial Engineering Sales Agency
ST. LOUIS 8, Missouri • H. C. Sharp Company
SAN ANTONIO 5, Texas • R. S. Ryden & Company
SAN FRANCISCO 3, Calif. • J. O. Martin Company, Inc.
SARANAC LAKE, New York • Budd's
SEATTLE 1, Wash. • Refrigeration Engineering Company
TARZANA, California • Locker Engineering Company
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FACTORIES AT LAPORTE, INDIANA AND CHICAGO, ILLINOIS

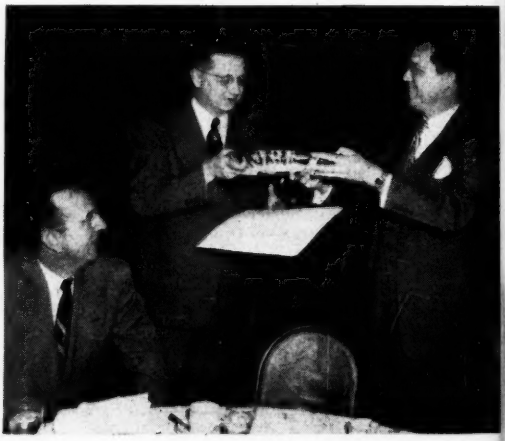
Major A. E. Carpenter

Upon completing his studies at the University of Pennsylvania in 1906, Mr. Carpenter joined Houghton and began to work his way through a series of positions that took him from foreign representative to the presidency in 1934. His father, Charles E. Carpenter, was with the company for 49 years, and served as president up to his death in 1929. His grandfather, Aaron E. Carpenter, who helped to found the company in 1865, headed it for 49 years.

Mr. Carpenter's service with Houghton was interrupted for two years during World War I, when he served overseas in the Army.

In addition to his duties as president of Houghton, Mr. Carpenter edits the company's external house publication, "The Houghton Line," tenth oldest of its kind in the country. As its editor, Mr. Carpenter writes in a casual style about anything that crosses his mind. His forthright comments and bold editorial policy have helped to put the publication in the enviable position it holds today.

At the close of the Annual Ferro Sales Meeting held recently, **G. W. HOFSTETTER,** manager of Ferro's Midwest territory, was presented with the 1948 Annual Sales Award presented by the Ferro Enamel Corp., Cleveland, Ohio, for outstanding accomplishments during 1948. Mr. Hofstetter was given a silver tray as a token of appreciation for a job well done.



G. A. Hutt, general sales manager for Ferro, presenting sales award certificate and silver tray to G. W. Hofstetter

MEETINGS

The **10TH ANNUAL NEW ENGLAND REGIONAL MEETING** of the **A.E.S.** will be held at Hotel Kimball, Springfield, Mass., on April 30. The educational session, beginning at 2 p. m., will feature a talk by W. L. Pinner on "Preparation of Steel for Decorative Plating." A forum panel discussion on plating problems will follow. A dinner at 6:30 p. m. is to be followed by a social program.

The **51ST ANNUAL MEETING** of the **AMERICAN CERAMIC SOCIETY** will be held April 24 through April 28 at the Netherland Plaza Hotel in Cincinnati. Of particular interest to porcelain enamelers is the enamel division program, of which B. J. Sweo, Ferro Enamel Corporation, is program chairman.

The **BUFFALO BRANCH** of the **A.E.S.** is sponsoring a regional meeting to be held May 7 at the Hotel Markeen, Buffalo, N. Y.

In addition to the many technical papers to be presented at the meeting, several plant trips and other social and educational functions have been scheduled.

The only exhibits on display at the 36th Annual Convention of the **AMERICAN ELECTROPLATERS' SOCIETY,** to be held in Milwaukee, June 27-30, will be the

Problem

To obtain a long-wearing Color Buff *without* increasing cut.

Solution

USE

BUFFS

Result

Costs substantially reduced and color greatly improved with Cutmaster style buff of soft bleached material.

WILLIAMSVILLE BUFF DIVISION
The Bullard Clark Company
DANIELSON, CONNECTICUT

Branch Exhibit of Plated Ware. Cash prizes of $100, $50, and $25 are being offered to the three branches whose exhibits indicate the highest degree of professional skill and craftsmanship.

Exhibits, to be eligible for prize competition, must be accompanied by publicly displayed placards fully describing every step in the preparation and processing of the plated ware.

SOCIETIES

On March 4 at a special dinner meeting sponsored by the Topp Oil & Chemical Company, the **MILWAUKEE BRANCH** of the **AMERICAN ELECTROPLATERS' SOCIETY** celebrated "President's Night," honoring S. S. Johnston, A.E.S. president. In addition to those present from the Milwaukee area, there were a number of visitors from the Chicago Branch, including Messrs. Kelly, Smallman, and Hazucka.

If the enthusiasm and interest exhibited by the more than one hundred members and guests is any indication, the 36th Annual A.E.S. Convention, to be held in Milwaukee June 27 through 30, and sponsored by the Milwaukee Branch, will be an outstanding success.

A Special Advisory Committee of the **AMERICAN ELECTROPLATERS' SOCIETY** has been assigned the problem of recommending to the Society a series of steps which will provide information for the manufacturing and general public about electroplating as a finish. The rec-

(Above, left and right)—Two close harmony groups of platers at the Milwaukee meeting
(Below)—A view of the members and guests assembled for dinner

Check

THESE ADVANTAGES . . . .

When you consider plating rack insulation check the obvious advantages in using BUNATOL No. 1000—the 100% solids Paste insulation.

1. Cost of material itself much less than any comparable Plastisol rack insulation.
2. Requires only one Primer. A big money saver in labor, investment and time.
3. Extra fine adhesion. Holds in all plating solutions and no seep back from contacts.
4. Sets up quick and does not run off the rack after dipping. More insulation on the rack and less drip waste.

Check and compare. Let us insulate a test rack for you (no charge) and you place it in actual service. That will prove that BUNATOL No. 1000 is the best insulation and the lowest in price.

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you'll never know
how much
you can save
by using
"LIQUID ENVELOPE"
PEELABLE
SPRAY-BOOTH
COATING
until you
take advantage
of this
test sample
offer

5 gallons shipped prepaid on a money-back guarantee $17.50.
Attractive low price on quantity re-orders.

BETTER FINISHES
AND COATINGS, INC.
264 DOREMUS AVE., NEWARK 5, N. J.
127 E. 7th ST., LOS ANGELES 14, CAL.
IN CANADA: HUGH RUSSEL & SONS, LTD.
MONTREAL AND TORONTO

ommendations of the Committee will be taken under advisement by the A.E.S. Executive Board before final policy on the matter is announced.

Members of the Special Advisory Committee include C. F. Nixon, Director of Process Engineering, Fisher Body-Ternstedt Div., General Motors Corp., Detroit, Mich., L. M. Hague, President, Hanson-Van Winkle-Munning Co., Matawan, N. J.; D. X. Clarin, District Manager, Oakite Products, Inc., New York, N. Y.; W. M. Phillips, Chairman of the Committee and Head of the Electrochemistry Dept., General Motors Research Laboratories, Detroit; R. M. Shock, Executive Secretary, National Association of Metal Finishers, Detroit; A. R. Putnam, A.E.S. National Office, Jenkintown, Pennsylvania.

TRAINING COURSES

The laboratory and lecture courses on "Appearance and Its Measurement" sponsored by **HENRY A. GARDNER LABORATORY, INC.**, Bethesda 14, Md., on February 3 and 4 and February 7 through 11, were well attended according to a recent announcement by Paul N. Gardner, vice president. A humorous diploma was presented to each man upon completion of the course.

Similar courses have been arranged for March and April.

NECROLOGY

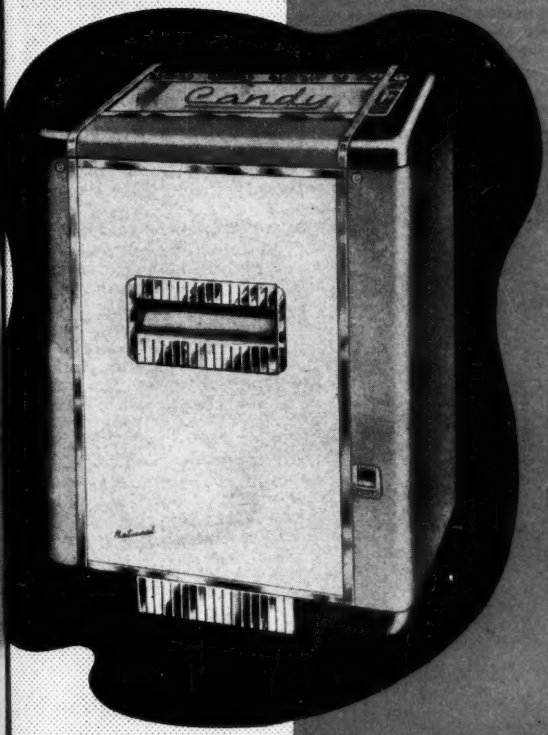
The Harbison-Walker Refractories Co., Pittsburgh, Pa., announces the death of **H. SCHUYLER ROBERTSON**, vice president, on Monday, February 21, 1949.

The Elliott Manufacturing Co., Binghamton, N. Y., announces the death on January 26, 1949, of the founder, **WINFRED W. ELLIOTT.**

Active in the flexible shaft industry since 1898, Mr. Elliott was a partner in the Binghamton Flexible Shaft Company from 1920 to 1931 when he sold out to establish the present company in 1932. In July 1948 he sold his interest to the remaining partners, his son, Boyd W. Elliott, and his son-in-law, Wilbur J. Kupfrian, who will continue the business as a partnership.

appearance and utility

● The Evans DeLuxe Lighter here illustrated is finished in polished silver plate protected by a coat of clear baking lacquer.



● Chromium plated and stainless steel trim forms a pleasing contrast with the maroon baked-on enamel on the body of the Model 8CE National Candy Vending Machine.

(Photo courtesy National Vendors Inc., St. Louis, Mo.)

New • EQUIPMENT • MATERIALS • PROCESSES

"Metal Brite"

"Metal Brite," an improved brightener for copper, brass, and bronze, is now being marketed by Kelite Products, Inc., Box 2917, Terminal Annex, Los Angeles 54, California.

Said to be extremely fast acting and to have a long life, Metal Brite produces natural, bright colors on copper, brass, and bronze. The brightening operation takes from 15 to 30 seconds.

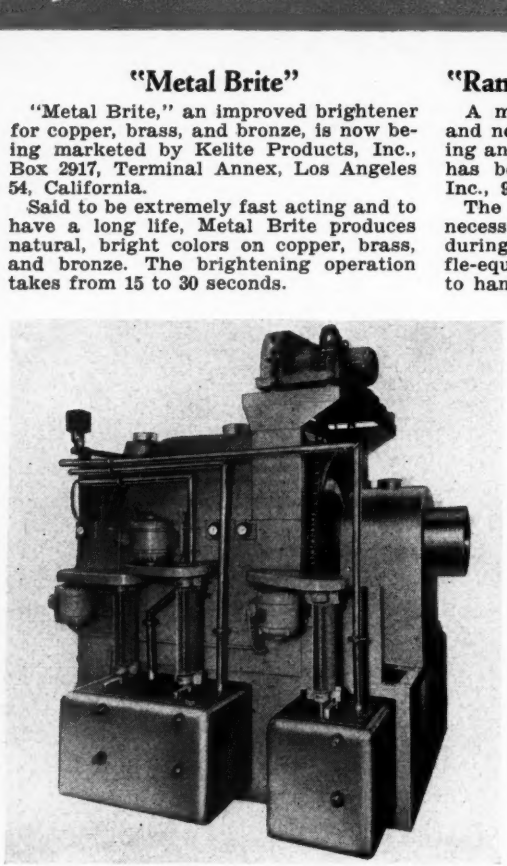
"Ransomatic" Washing Machine

A machine designed to wash, pickle, and neutralize metal parts prior to plating and designated as the "Ransomatic" has been announced by N. Ransohoff, Inc., 9 E. 72nd St., Cincinnati 16, Ohio.

The parts are transported through the necessary solutions automatically and during processing are cascaded in a baffle-equipped drum. The machine is said to handle batches in order without mixing, and the speed of the machine can be regulated according to the type and condition of the parts to be processed. Each processing cycle is independently adjustable, as well as the process as a whole.

According to the manufacturer, the cascading action obtained in the Ransomatic reduces processing time by increasing the effectiveness of the processing solutions. Other features pointed out by the manufacturer include automatic packless pumps which pump the various solutions into the drum and automatic valves through which the solutions drain from the drum in proper sequence. The machine is equipped with an acid-resisting hood which may be connected to an exhaust system to secure proper venting of fumes or vapor.

Depending upon the user's requirements, pumps, tanks, and



"Ransomatic" Washing Machine

the drum itself may be supplied in molybdenum bearing stainless steel or copper-lined steel. The machine may be further supplied with any desired number of solution tanks.

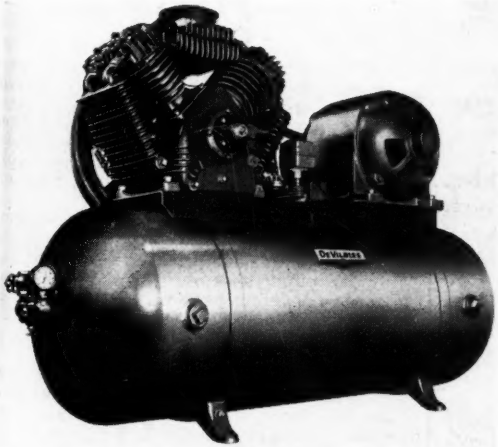
DeVilbiss "V" Type 4-Cylinder Air Compressor

Further refinement of existing features of present DeVilbiss compressing outfits, plus the introduction of an enlarged and highly refined cooling system, floating type tank mount, highly sensitive and efficient valve design and other improvements are now incorporated in the DeVilbiss "V" Type 4-Cylinder Air Compressor introduced by The DeVilbiss Co., 300 Phillips Ave., Toledo 1, Ohio.

Employing a highly developed two-stage principle in both banks of cylinders, the displacement of the 10 h.p. unit is 47.86 c.f.m. at 175 p.s.i. Similar high displacement is attained in the 15 h.p. and 7½ h.p. models, all of which are available for 175 or 125 p.s.i. use.

Features and principles of design incorporated into the DeVilbiss "V" Type 4-Cylinder Air Compressor are: dynamically balanced, forged crankshaft; forged connecting rods with automotive type prefit bearings; frictionless ball-type main bearings; tapered mounting for balanced flywheel; extra large inter and after-coolers; efficient air filter and muffler; ring and centrifugal force oiling; precision bored and honed cylinders; removable cylinder blocks; and removable valve assemblies.

The compressor is available to operate from all common electrical outlets and is supplied to meet code requirements of different cities and states.



DeVilbiss "V" Type 4-Cylinder Air Compressor

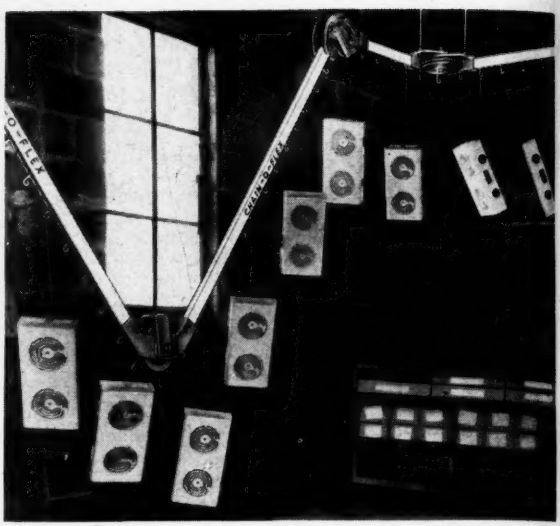
Filt-R-Stil Cartridge Demineralizer In Use

Filt-R-Stil Cartridge Demineralizer

A redesigned Filt-R-Stil Cartridge Demineralizer for delivering the low-cost chemical equivalent of distilled water without heat and at a maximum rate of 10 gallons per hour has been announced by the Ion Exchange Products Dept., American Cyanamid Co., 30 Rockefeller Plaza, New York 20, New York.

Like previous models, the unit consists of three principal parts: a disposable cartridge containing Cyanamid's IONAC ion-exchange resins, which are synthetic chemicals capable of removing dissolved ionized solids without imparting a thing to the water being treated; a bracket or support for the cartridge; and an electrical conductivity indicator, which shows the quality of all treated water and indicates when the cartridge is exhausted and needs replacement. The new

Chain-O-Flex Overhead Conveyor



wall model is lighter, simpler in design, and more compact. In addition, the conductivity indicator has been improved to show the quality of treated water continuously. The unit requires only 2 watts of electricity.

To install, the Filt-R-Stil need only be fastened to a wall and the inlet tubing attached to a cold water faucet. When the water is turned on, it flows through the cartridge and emerges essentially mineral free. The water delivered by the cartridge unit is guaranteed to contain no more than 10 parts of dissolved ionized solids per million parts of water, exclusive of silica. The quantity of water treated per cartridge depends on the quality of the raw water available. The rated capacity of the cartridges used is 1100 grains (as calcium carbonate). Thus, one cartridge will produce at least 550 gallons of demineralized water from a 2 grain per gallon supply. The unit can be operated either continuously or intermittently, and delivers demineralized water a few seconds after the tap is opened.

YOUR SIGNAL!

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Clear Metal Lacquer

. . . FOR . . .

SILVER, CADMIUM, ZINC, COPPER, BRASS, ALUMINUM

Outstanding

1. **Adhesion to metal surfaces**
2. **Resistance to sulfur tarnish**
3. **Resistance to oxidation**
4. **Resistance to perspiration**
5. **Resistance to abrasion**

Pale in color. Takes 100-200% reduction. Dries under 15 minutes.

A premium product—priced at ordinary lacquer levels.

The Varnish Products Company

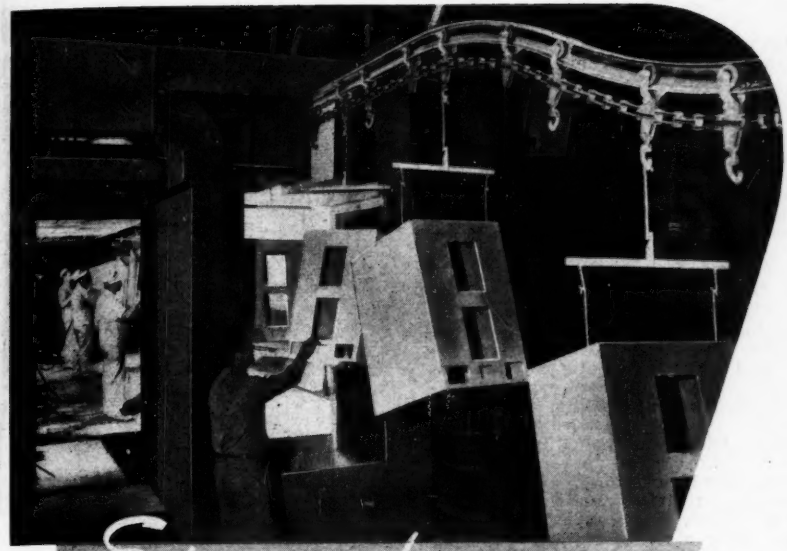
5208 Harvard Avenue **Cleveland, Ohio**

Chain-O-Flex Overhead Conveyor

Chain-O-Flex, a flexible chain conveyor for use where a constant flow of material or assembled products is essential, is now being manufactured by the Chain-O-Flex Corp., Franklin Park, Ill., and distributed exclusively by Industrial Equipment Co., 315 N. Ada St., Chicago 7, Ill., and its representatives.

Well guarded by an enclosed design throughout, the Chain-O-Flex is designed for safe operation. Another prime advantage is quick assembly of any practical conveyor system pattern, merely by bolting parts together. All corners are highly flexible and adjustable to any desired degree. The system increases its efficiency when the number of corners is increased.

Variable speeds are obtained by adjusting the hand wheel on the drive unit, which will provide a 3-to-1 speed ratio. Multiple drive units may be used.



Engineered
FOR TOP PRODUCTION

Present day high production requirements—which combine high quality with economy of operation—are built into every SPRA-CON installation. The illustration shows one of many SPRA-CON installations of complete finishing systems. We can supply all production requirements. It will pay you to consult with us on your finishing requirements.

"The Finishing Touch"

The SPRA - CON COMPANY

Engineers and manufacturers of conveyors, ovens, washers, and equipment for complete paint finishing systems . . .

1402 North Western Avenue, Chicago 22, Ill.

Drumobile

Developed to eliminate manual exertion from the handling of drums and barrels, an improved three-wheeled carrier designated as the Drumobile is now being marketed by the Ernst Drumobile Division, Brantwood Products, Inc., 115 Brayton St., Buffalo 13, N. Y. Specifically designed to lift, transport, and release any size or type of steel drum, wood barrel, or cylindrical fiber container, the Model 800 Series now available is designed for loads up to 850 pounds in 50 to 60-gallon sizes.

The Drumobile is claimed to possess many advantages in addition to safe and speedy handling. The unit picks up the container, carries it in a level upright position, and deposits it easily without tilting. Thus, open containers may be carried without risk of spilling, even when brim full.

Slightly wider than the drum itself, the Drumobile can be operated in close quarters. The lever handle, after serving its function in lifting the load and actuating the safety lock, becomes a vertical free-swinging steering column adapting itself to any height. Its fulcrum is so located as to provide excellent mechanical advantage at the end of its 17½-inch length. The same leverage principle is employed on the welded chassis which is equipped with a choice of three accessory

Drumobile in use

for speedy low-cost printing

use NAZ-DAR Silk Screen Plates

★ Whether hand cut or photographic silk screen plates are best suited to your type of work, you'll find NAZ-DAR a reliable and economical source of supply. SILK SCREEN is the MODERN method of applying decorative designs, lettering and trade marks, because it provides absolute UNIFORMITY, SHARP DETAIL, SPEED and LOW COST. You can apply on any surface.

We maintain a complete service for the trade and can supply you with any type of Silk Screen Plate needed, as well as Silk Screen Inks, Lacquers, Squeegees, Decalcomania Paper, Frames, Cutters and accessories.

All production men should investigate the application of Silk Screen Stencils to their production problems.

★ *Write Department PF 4-49 for information or copy of new catalog No. 25.*

Naz-dar Company

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Start Clean . . .
Stay Clean!

It's Easy To Keep Your Plating Bath Clean With Red Label DARCO!

Don't run the risk of wasting the time, labor, and expense involved in extensive cleaning of work prior to plating by putting the work into a dirty plating bath! *Start* clean . . . *stay* clean! Use Red Label Darco S-51 to *keep* your plating bath free of the impurities that cause trouble.

Red Label Darco S-51 traps impurities that slip by the mechanical filter—adsorbs them to *its* surfaces—before the are deposited on the freshly cleaned surface of your work. This means better work—at lower cost—in bright nickel, copper, iron, zinc, cadmium, tin, gold, and silver solutions.

Red Label Darco S-51 is especially treated for use in plating—*it's the only carbon that will meet the benzol-mercury test!* Red Label Darco S-51 is especially easy to handle! It's easy to wet . . . easy to incorporate into the slurry. Darco technicians are ready to show you how to make the most of Darco's advantages. Write to your Darco Distributor for a sample of Red Label Darco S-51 *today*—there's one near you, because Darco distributors are everywhere.

Is your plating bath as clean as the water in your final rinse?

DARCO CORPORATION

60 East 42nd Street, New York 17, N. Y.

gripping devices for steel drums, wood barrels, or rimless fiber containers.

Neither the gripping mechanism nor any other part of the vehicle will dent or puncture any container, it is claimed.

Multilift Improved Rotary Magnetool

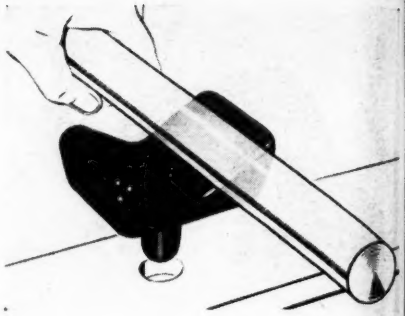
An improved design of the Multilift Rotary Magnetool, used for steel pickup purposes, is said to provide 50 per cent more magnet power, increased rigidity of frame, and a heavier removable handle with a rubber grip, according to the manufacturer. Multifinish Manufacturing Co., 2112 Monroe Ave., Dept. 491A, Detroit 7, Michigan.

The rotating magnetic tube is propelled manually in carpet-sweeper fashion to pick up steel scrap or parts from floors, parking lots, and driveways, to remove tramp iron from liquids, powders, and the like, and to separate steel from other materials. The tools are waterproof and oil-proof and operate without wires or electricity. An acidproof model adaptable for use in tanks is also available.

The magnetic tube rotates with the wheels and loads automatically to a thickness of ¾ inch on the entire 360 degrees of surface. Unloading is accomplished by pushing the wiper ring from one end of the tube to the opposite end where a non-magnetic area causes instant release of the load. The unloading area is tapered so that parts slide off readily without lodging.

According to the manufacturer, constant contact of the unit with steel will not reduce its magnetic power. It is available in standard sizes ranging from 9 to 24 inches overall for any job requirement.

Multilift Improved Rotary Magnetool



Unbreakable Anode Rod Support

Unbreakable Anode Rod Support

A simplified, self-aligning, unbreakable anode rod support which is made of nonferrous metal completely covered with tough semi-hard rubber is now being marketed by the Automotive Rubber Co., Inc., 8601 Epworth Blvd., Detroit 4, Michigan.

According to the manufacturer, the pin of the support sets in a hole provided in the tank flange, and the support pivots to compensate for misalignment. It will support excessive loads and rods up to ¼ inches in diameter.

Binks Type BF Two-Stage Air Compressors

Six new models of the Type BF two-stage air compressor have been added to the spray painting and finishing equipment line of the Binks Manufacturing

By the way, have you ever tried Vedoc?

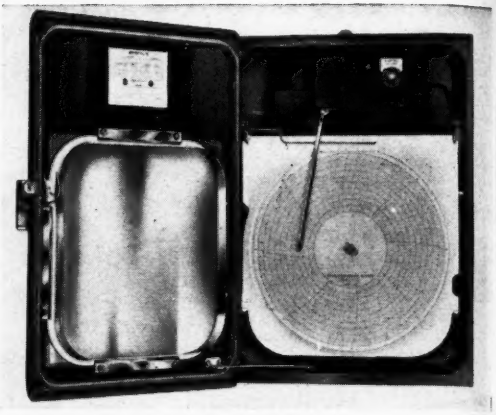
TAKE A TIP and get better acquainted with *Vedoc* finishes, an outstanding line of *organic* industrial coatings. All *Vedoc* finishes are developed for a specific use, then slightly varied to best fit each customer's production setup. Let us tell you more about them!

LIQUID PLASTICS DIVISION

FERRO ENAMEL CORPORATION

4150 East 56th Street

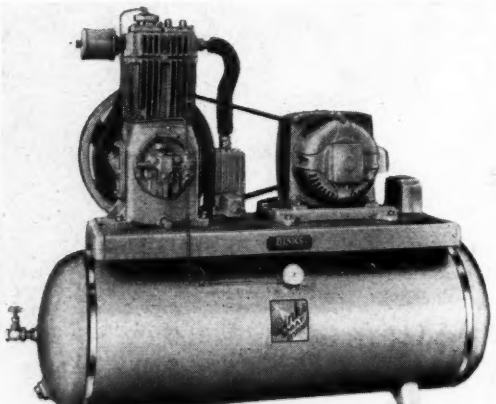
CLEVELAND 5, OHIO



Co., 3118-40 Carroll Ave., Chicago 12, Ill. These models are designed to supply compressed air for spray painting, as well as air at higher pressures than those normally used for spray finishing. Thus the same compressor serves as a source of air for various uses. The units are built for 200-pound working pressure, and the tanks are tested to 300 pounds. The standard pressure setting is 160 to 200 lb. Special settings are also available.

Powered by motors ranging from 1½ to 10 h.p., the compressors have a displacement ranging from 7.13 to 40 cubic feet per minute. Features of the unit include Timken main bearings, Lynite connecting rods, automotive type pistons, non-breakable steel valves, extra-efficient copper-finned intercoolers, totally enclosed, dustproof crankcase, and a new combination intake air filter and silencer. A constant level lubrication system is used with all models, except the 10 h.p. unit, which is pressure lubricated. A patented loadless starting mechanism completely unloads the compressor until the motor has attained its full load speed on re-start. Multiple V-belt drives are supplied for units of 2 h.p. and up.

The standard 1,750 r.p.m. motors used on the Binks Type BF Two-Stage Air Compressor (2 h.p. and up) are equipped with overload protection starter switches. Each 60 and 80-gallon tank is supplied with a 2½-inch diameter 300-pound pressure gage, safety valve, tank drain, and shut-off valve.



Binks Type BF Two-Stage Air Compressor

Bristol "Running-Count" Recorder

A new recording instrument, known as the "Running-Count" Recorder, product of The Bristol Co., 108 Bristol Rd., Waterbury 91, Conn., plots on a circular chart a curve of the number of operations against time. It records the total count of intermittent operations and the time at which each one occurs, and is used on production machinery to record work-producing operations or number of pieces produced.

With the Running-Count Recorder, the total number of operations or pieces produced can easily be found by multiplying the number of complete pen tranverses across the chart by the count per transverse for which the instrument is calibrated.

The hourly rate of production can also be easily read from the chart, thus providing information regarding the effect of fa-

Hammond
of KALAMAZOO

Announces

A COMPLETE NEW LINE

10 SEMI-AUTOMATIC

POLISHING AND BUFFING MACHINES

Hammond offers another opportunity to reduce finishing cost and improve finishes.

In addition to our wide line of Polishing Lathes, Abrasive Belt and "OD" Finishing Machines, Rotary and Straight Line Automatics, we are now building a complete line of 10 Semi-Automatic Polishing and Buffing Machines.

Finishing costs MUST come down. As builders of America's most complete line, we have the answer.

Write for Catalog and send one finished and several rough samples for complete Engineering report. There is NO OBLIGATION.

Model SE2SF with Hammond Polishing Lathe

Hammond Machinery Builders INC

1622 DOUGLAS AVENUE • KALAMAZOO 54, MICHIGAN

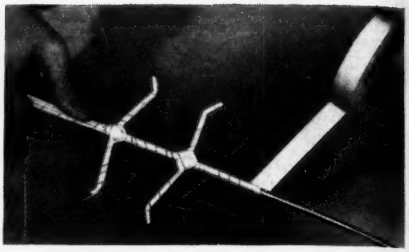
tigue on operators, variations in productivity between operations, effectiveness of job training programs, and the effect of variations in working conditions.

"Scotch" Tape No. 470

"Scotch" Tape No. 470, designed for wrapping electroplating racks and for blocking off parts being plated, is now being distributed by the Minnesota Mining & Mfg. Co., St. Paul 6, Minn. A yellow, pressure-sensitive plastic-backed tape, it is said to possess excellent resistance to acids, alkalies, water, salt water, alcohol, aliphatic hydrocarbons, and oils.

Specially formulated for the electroplating trade, the tape will withstand prolonged immersion in most electroplating solutions, including chromium, without becoming brittle or cracking, according to 3M company laboratories. It will also withstand most hot or cold cleaners, including acids and caustics, but is not designed to be resistant to trichlorethylene cleaners and degreasers.

Several advantages claimed for Scotch Tape No. 470 are: holds tight on contact and sticks until the job is done; conforms snugly and smoothly to oddly-shaped pieces and irregular surfaces; affords strength plus stretch; and comes off easily and cleanly without clean-up work.



Plating rack insulated with "Scotch" Tape No. 470

Metric Tumbling Lacquer

The Research Division, Metric Lacquer Manufacturing Co., Irvington 11, N. J., has announced the development of a "tumbling" lacquer designed specifically for metal parts which can be economi-

FOR BETTER PAINT ADHESION

use

PHOSCOTE

A new type Phosphating Cleaner

Paint Strippers
—
Paint Booth Coatings
—
Paint Coagulators
—
Cleaning Compounds
—
Phosphating Materials
—
Drawing Compounds

- Phosphates as it cleans—excellent cleaning action, eliminates necessity of cleaning prior to phosphating operation.
- Phoscote may be used for treating both steel and aluminum.
- Produces an evenly dispersed phosphate coating resulting in better paint adhesion.
- Is non-toxic, non-corrosive and has a mild pleasant odor.
- Phoscote is economical to use due to low using-concentrations, ease of application, and extreme efficiency of the material.

Rust Removers
—
Rust Preventives
—
Degreasing Solvents
—
Grinding Compounds
—
Cutting Compounds
—
Forging Compounds

Samples and further information supplied on request.

CHEMCO PRODUCTS COMPANY, Inc.

7740 WEST 47TH STREET • LYONS, ILLINOIS

Finest finishes are applied after Bonderizing. Automobiles, kitchen equipment, washers, ironers, dryers, tractors and garden tools, lawnmowers—the list could go on to include almost every type of painted steel article on which lasting appearance is important.

The Bonderizing process prepares metal to take and *hold* paint. It resists corrosion, confines damage from scratches and dents to the injury itself. Bonderizing costs little, is simple to operate, easy to control, positive and uniform in results.

Bonderizing under the finish helps keep the customer satisfied by protecting and preserving paint appearance and service life.

Your letter or card will bring you full information. Write today.

Bonderite, Parco, Parco Lubrite—Reg. U. S. Pat. Off.

Parker

PARKER RUST PROOF COMPANY
2172 East Milwaukee Ave.
Detroit 11, Michigan

BONDERIZING Holds Paint to Metal . . . PARKERIZING Inhibits Rust . . . PARCO LUBRIZING Retards Wear on Friction Surfaces

cally coated in tumbling equipment.

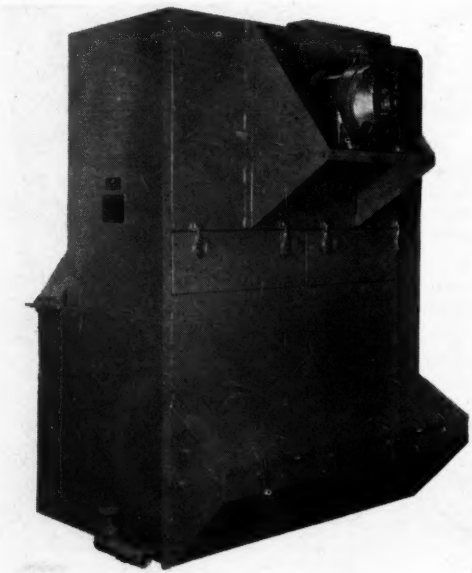
Available in a variety of colors, Metric Tumbling Lacquer is claimed to offer ease of application, superior coverage with fewer coats, high resistance to "sticking" and superior adhesion.

Uni-Wash "Senior" Dust Collector

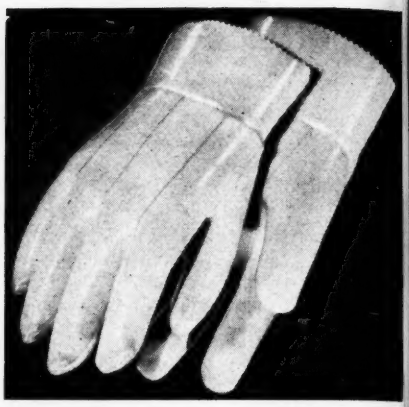
Ideal for removing dust from a large number of grinding or other finishing machines, the Uni-Wash "Senior" Dust Collector, product of the Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich., collects dust-laden air, water washes it twice, dries the air, and then discharges it within one compact unit.

The water is continuously recirculated by suction from the exhauster fan, which is an integral part of the unit. There is no pump to clog up and increase maintenance problems. Another important feature claimed for the unit is the removal of dust from the air before it reaches the fan, thus reducing fan maintenance.

The Uni-Wash Senior Dust Collector is furnished complete with motor, wiring, and all accessories ready to operate. Installation requires only that the power line, a water source, and a drain be connected. The unit is available in capacities from 5,000 to 30,000 cubic feet per minute.



Uni-Wash "Senior" Dust Collector



Surety Coated Fabric Gloves

Surety Coated Fabric Gloves

Development of a coated fabric glove said to possess unusual resistance to abrasion and chemical attack has been announced by the Surety Rubber Co., Carrollton, Ohio.

Sureseal PK, a chemical adaptation of Surety's Sureseal synthetic rubber, is used on this new glove and is claimed to resist virtually all industrial chemicals, including acids, alkalies, oils, petroleum hydrocarbons and solvents, alcohols, ethers, esters, hydraulic fluids, refrigerants, and plating solutions.

The manufacturer also reports that the glove shows improved resistance to abrasion in both laboratory and field tests. The coating on the glove is thick and pliable, providing adequate cushioning for all types of heavy work.

Surety Coated Fabric Gloves are available in knit wrist, band-top, and 12 and 14-inch gauntlet types. All styles are jumbo size with curved fingers.

START with a K-P Belt for a FAST FINISH

Korb-Pettit Spiral Woven Wire Conveyor Belts are fabricated in suitable metals and mesh sizes for baking, conditioning, heat treating, material-handling, processing and washing. Particularly well adapted to conditions where drainage and the free circulation of air are required. K-P Flextrough Belts with flanged edges prevent the escape of small parts. Side chains can be provided for sprocket drive.

K-P Spiral Woven Wire Conveyor Belts increase production and sting the maintenance bill at the same time because they are backed by superior engineering skill and the accumulated experience of many years.

Consult with the K-P district sales office or write direct. Korb-Pettit Wire Fabrics and Iron Works Inc., 1509 North Mascher Street, Philadelphia 22, Pa.

•

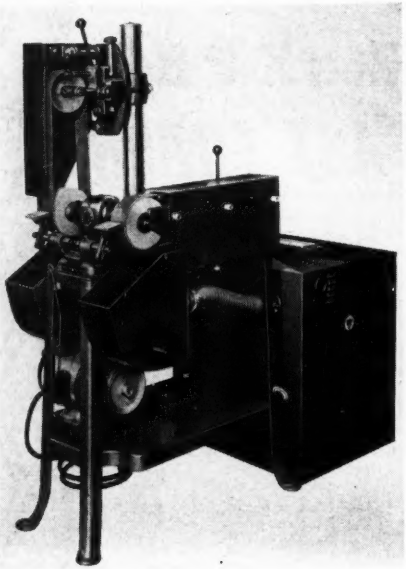
Korb-Pettit Spiral Woven Wire Conveyor Belts

"Keeps Promises"

Wire mesh, Spiral Woven Wire Conveyor Belts, Infra-Red Conveyor Dryers, Leather Finishing and Drying Machines, Complete Special Purpose Conveyors designed and Manufactured to Order.

Delta-Milwaukee H-Type Grinding, Polishing, and Deburring Machine

An H-type grinding, polishing and deburring machine utilizing coated abrasive belts has been developed by the Delta Manufacturing Division, Rockwell Manufacturing Co., 600 E. Vienna Ave., Milwaukee 1, Wis. Available in four different models, the portable unit is compactly constructed so as to occupy a minimum of floor space.



Delta-Milwaukee H-Type Grinding, Polishing, and Deburring Machine

An outstanding feature of the Delta-Milwaukee H-Type Grinding, Polishing and Deburring Machine is its adaptability for the use of two different quality grit belts at the same time. The result is said to be an increase in the production of small parts that require more than one finishing operation. In addition, the machine can be easily converted into a buffing machine.

Each of the four basic models includes an arbor head, an idler unit, a straight-faced contact roll, and abrasive belts. The sturdy arbor head is strongly constructed of a fine grained gray iron casting. The precision ground ⅝-inch arbor shaft operates in preloaded, double-sealed, lubricated-for-life ball bearings, firmly held in absolutely round, properly lined-up, and precision-bored-for-accuracy bearing seats to assure smooth, even, and vibrationless operation. Extending 3½ inches out from the inner flange at each end, the arbor shaft has a 2½-inch Acme thread at the ends to accommodate contact rolls from ⅞ to 2⅞ inches wide. To further eliminate vibration, arbor pulleys are dynamically balanced. Two drive belts can be run through the bottom of the arbor head for use on a welded steel stand, or through the back of the arbor head for use on other benches.

The general purpose, square stitched, medium-density, glued contact roll has steel bushings for the ⅝-inch arbor. Featuring an adjustable belt tension hand release, belt tracking adjustment, adjustable pulley position, and lubricated-for-life ball bearings, the idler provides for smooth operation with an idler drum 5⅝ x 2½ inches.

Aluminum oxide belts in four different grits are available for the machine for general purpose use on steel, brass, forgings, die castings, and some plastic materials. According to the manufacturer, virtually any desired finish may be obtained with the machine.

Iridite "Metcote"

Iridite "Metcote," a chromate-type chemical polish for producing a lustrous, corrosion-resistant surface on copper, brass, or bronze surfaces, has been introduced by Allied Research Products, Inc., 4004 E. Monument St., Baltimore 5, Md. Applicable to sheet, rod, castings or forgings, it serves as a triple-cross process: for brightening, tarnish resistance, or paint base; and is applied by a short non-electrolytic dip, operated at slightly elevated temperatures.

Iridite Metcote is claimed to offer three advantages over sulfuric or nitric acid polishing solutions in that it is non-fuming and non-critical during operation, and that the work being processed is chemically polished and does not become etched, even from long immersion periods. In addition, production rates may be increased by raising the temperature of the bath, it is said. The usual plating shop equipment and operators are all that is needed to operate the process in any type of plant.

Work to be processed with Iridite Metcote should first be thoroughly cleaned in

SIMONDS ABRASIVE CO.

PHILADELPHIA, PA.

ABRASIVE GRAIN

FOR GENERAL INDUSTRIAL USES

polishing...tumbling...pressure blasting...anti-slip

Fused crystalline aluminum oxide abrasives. In all standard grain sizes or run-of-mill sizes. Trade-named BOROLON, BOROBLAST, BOROGRIT, and SANS-SLIP and produced under complete Simonds control . . . starting in the electric furnaces of Simonds Canada Abrasive, Ltd. and continuing throughout each process in our Philadelphia plant. Let's send you inspection samples and prices. When writing specify grain size required and use of abrasive.

SIMONDS ABRASIVE COMPANY, Phila. 37, Pa. • Distributors in all principal cities

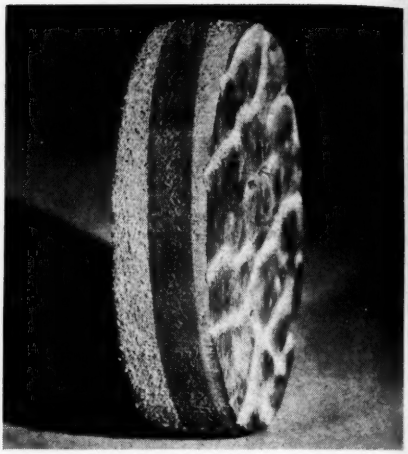
standard plating shop solutions. After thorough rinsing, the parts are handled as follows: Iridite Metcote, rinse, optional bleaching dip and rinse, hot rinse and dry.

Iridite Metcote is sold in a form requiring only the addition of a small amount of hydrochloric acid to be ready for use.

Tusko Laminated Walrus Polishing Wheel

A walrus hide polishing wheel of wedge-layer structure designed to eliminate abrasive injury in fine finishing has been introduced by Greene, Tweed & Co., North Wales, Pa., as an addition to the Tusko line of soft-tanned and hard-tanned walrus hide products.

Surface scratch is minimized by the Tusko Laminated Walrus Polishing Wheel through the use of strong-but-soft cement; all scratch is said to be removed by reason of the wheel's wedge-layer design. Layers are set at an angle; thus, when the wheel revolves, the joint areas weave from side to side of the wheel. This enables the leather to wipe off any area traversed by the joint areas, removing any cement scratch and smoothing the surface.



Tusko Laminated Walrus Polishing Wheel

Design of the wheel provides an additional advantage in that thin-layered walrus leather strips may be used. Wheels may thus be supplied in any diameter or any thickness.

The Tusko Laminated Walrus Polishing Wheel is said to be especially adaptable to the finishing of copper, nickel, German silver, and stainless steels; to the burnishing of unevenly shaped objects; and to working inside wide-mouthed objects.

NEW
SILICONE-BASE
HEAT RESISTANT FINISH

MICO Aluminum hailed by leading manufacturers as the most heat-stable finish ever to be developed for every day commercial use.

NOW—a heat resistant finish that protects—*virtually doubles the life*—of vital parts in hundreds of products like mufflers, engines, boilers, ovens, oil and gas burners. MICO Aluminum has passed 23 different tests for thermal, chemical, and physical stability, and has thoroughly proved itself on the production line. *Investigate* MICO. *Get the facts!* Write today for your copy of the new MICO folder . . .

MICO . . . THE SILICONE BASE FINISH THAT WITHSTANDS 1000° (F.)—WITHOUT SURFACE BREAKDOWN.

Manufactured Exclusively by
MIDLAND INDUSTRIAL FINISHES COMPANY
Dept. PF-4 Waukegan, Illinois
ENAMELS • SYNTHETICS • LACQUERS • VARNISHES

Enthone Metal Stripper for Nickel and Other Metal Coatings

Enthone, Inc., 442 Elm St., Dept. PF, New Haven, Conn., has announced the development of a material called Enthone Metal Stripper for chemically dissolving nickel and other metal coatings from steel without attacking the steel. The stripper is alkaline in nature, can be contained in a steel tank, and requires no electric current. The parts to be stripped are merely immersed in a solution of Enthone Metal Stripper salts, in the temperature range from 160 to 180 deg. F. Stripping speed varies from 0.0002 to over 0.001 inch per hour, depending upon the concentration of salts and the operating temperature.

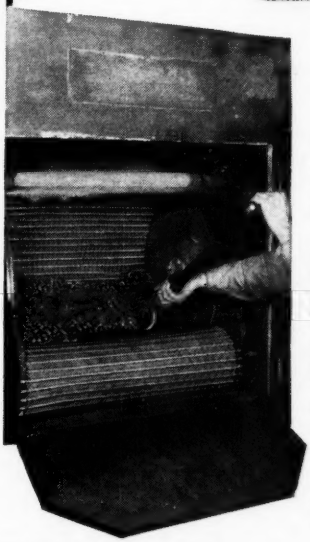
Cambridge WIRE BELTS

combine processing and movement with

SPEED

ECONOMY

DURABILITY



Speed, continuous production, and lower handling costs are the features of this Cambridge Roller Chain Belt for tumbling metal parts. Open mesh permits free drainage.

Whether your products are treated with heat, cold or corrosive agents, you can get a faster, more economical output by combining processing with product movement on a Cambridge woven wire conveyor belt.

SPEED—because the moving belt permits *continuous* treatment, ends time-wasting machine stops.

ECONOMY—because the belt reduces manual handling. In most cases one loader is adequate to feed the belt.

DURABILITY—because the wire belt for your particular installation is made from the specific metal or alloy to the mesh or weave best suited to your requirements.

Call in your Cambridge Field Engineer whenever you have a problem combining movement with processing.

FREE! 130 pages of illustrated data on Cambridge belts. Gives design, application, installation data. Write today on your letterhead.

There's a Cambridge Sales-Engineering Office near you!

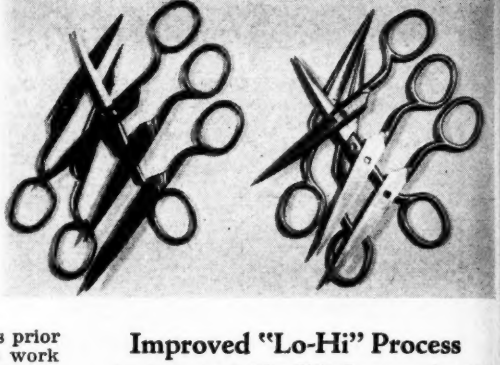
Cambridge Wire Cloth Co.

Wire cloth in rolls.

Also specialized wire fabrications

Dept. A
Cambridge 4,
Maryland

OFFICES IN PRINCIPAL INDUSTRIAL CITIES



Nickel plated scissors stripped with Enthone Metal Stripper. (Left) nickel plated parts before stripping. (Right) parts after stripping, showing no attack on the base steel

The process is stated to be ideal for the removal of nickel plate from bulk work, such as barrel nickel plated steel, which heretofore has been impossible or difficult to strip without attacking the base metal. The Enthone process does not etch or attack the base steel in any way, it is claimed. The steel is left in the same condition as it was prior to plating and, in most cases, the work needs merely to be dipped in acid and can be replated.

The stripper is also effective for removing copper plate from steel, as well as silver, cadmium, and zinc. The solution is not suitable for removing nickel coatings from zinc base die castings or copper alloys.

Enthone Metal Stripper is covered by U. S. Patent No. 2460896 and further patents are pending.

Improved "Lo-Hi" Process

An improved "Lo-Hi" Process for the preparation of metals for plating and vitreous enameling has been announced by the Northwest Chemical Co., 9310 Roselawn Ave., Detroit 4, Mich. The two-tank procedure is claimed to not only remove soil of all types regardless of the quality of the steel but to also activate the surface of the ware.

In addition to its long life, the Improved Lo-Hi Process is easily controlled and is said to dissolve light surface rust and soften scale on welded sections. The cleaning cycle is five minutes in each tank with no intervening rinse.

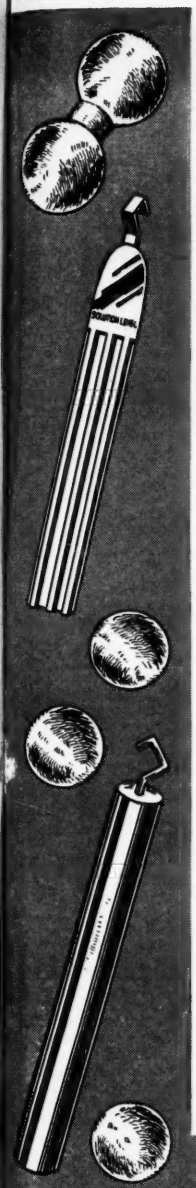
H-VW-M Kote-Rax Grade K

The Hanson-Van Winkle-Munning Co., Matawan, N. J., is now marketing Kote-Rax Grade K, a rack coating designed to insulate and protect plating racks and fixtures in all types of electroplating and anodizing solutions. This formulation, a plastisol, is said to possess excellent chemical resistance and to be free from any tendency to introduce organic im-

GOLD PLATING SOLUTIONS
In All Colors
Guaranteed 100% Pure Gold Content
Troy Weight - Color Constant
Tarnish Resistant
Proven Quality by the Acid Test
Write or call our experts about your plating problems
Davis-K-Products Co.
54 West 22nd St., New York 10, N. Y.
Oregon 5-0094
5-0095

FELT DOES IT BETTER

Paramount Brand
FELT WHEELS
Superior for Polishing and Buffing
When you order FELT WHEELS specify PARAMOUNT BRAND FELT WHEELS for top quality and uniformity.
BACON FELT CO. WINCHESTER, MASS.
Established 1824
"America's Oldest Felt Manufacturer"
Send for our New Complete Catalog



HARSHAW ANODES and CHEMICALS

You can depend on Harshaw products to keep your production moving. For more than fifty years we have concentrated on improving the quality of the anodes and chemicals used by platers.

NICKEL PLATING . . . nickel anodes—all commercial grades and sizes . . . anode bags . . . nickel salts—single and double . . . nickel chloride . . . nickel carbonate . . . boric acid.

CHROMIUM PLATING . . . pure "Krome Flake" 99.8% CrO_3 . . . sulphates less than .10% . . . lead, tin-lead and antimony-lead anodes.

COPPER PLATING . . . copper ball anodes . . . Rochelle Salts . . . sodium and copper cyanides . . . copper sulfate . . . copper fluoborate.

CADMIUM PLATING . . . ball and cast cadmium anodes . . . cadmium oxide . . . sodium cyanide.

TIN PLATING . . . cast tin anodes . . . sodium stannate . . . stannous sulfate . . . tin fluoborate . . . acid tin addition agent.

ZINC PLATING . . . ball and cast zinc anodes . . . sodium and zinc cyanide . . . zinc sulfate.

LEAD PLATING . . . cast lead anodes . . . lead fluoborate.

SILVER PLATING . . . silver cyanide . . . silver nitrate.

THE **HARSHAW CHEMICAL** CO.
1945 East 97th Street, Cleveland 6, Ohio
BRANCHES IN PRINCIPAL CITIES

COMPLETE STOCKS CARRIED IN:

CLEVELAND	DETROIT	PHILADELPHIA
CHICAGO	HOUSTON	PITTSBURGH
CINCINNATI	LOS ANGELES	NEW YORK

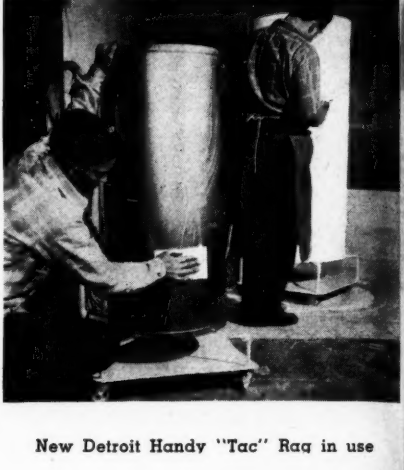
purities into bright plating solutions.

The application of Kote-Rax Grade K is rapid and simple. According to the manufacturer, only two dips are required to obtain a final coating which is equivalent to ten or more dips of other solvent-dispersed vinyl materials because the coating is 100 per cent solids.

Improved Sol-Speedi-Dri

An improved Sol-Speedi-Dri, designed to absorb floor greases and oils, is now being marketed by the Safety & Maintenance Co., Inc., New York, New York.

Claimed to be more absorbent, the improved Sol-Speedi-Dri makes larger areas of slippery floor safe because it is fluffier and has 10 per cent greater bulk per pound.



New Detroit Handy "Tac" Rag in use

New Detroit Handy "Tac" Rag

After extensive research and trial use in some of the leading industrial plants of the country, the Detro Manufacturing & Sales Co., Inc., Culver City, Calif., is now marketing a non-inflammable "Tac" Rag. According to the manufacturer, it will always remain soft and tacky and will never dry hard or stiff throughout its useful life.

WAR SURPLUS BARGAINS

4 Wheel Materials Handling Trucks

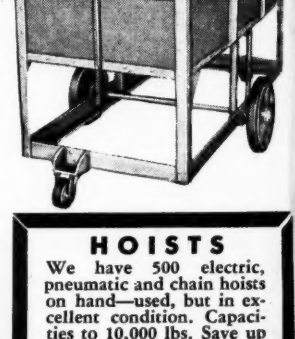
Here's an ideal truck for finishing plants—for handling pieces in and out of production. Roomy, waist-high hardened fibre bin (48" x 24" x 11" deep) is designed for fast loading and unloading. Equipped with big roller bearing 12" x 2" rubber or fibre-tired center wheels and two 4" steel wheels. Used—but in almost *new condition.*

Price $17.50 each

F.O.B. Minneapolis

1 to 5—17.50 ea.; 6 to 25—$16.50 ea.; 26 to 95—$15.50 ea.

For F.O.B. Chicago add $3.25 ea.



10 lb. CO2 Fire Extinguishers

Brand new 10 lb. capacity — fully charged—ready to use. Ideal all-purpose unit for your plant. Fights fire without mess or damage.

Regular List $48.50
F.O.B. Chicago

Our Price $36.50

ACME EQUIPMENT CO., INC.

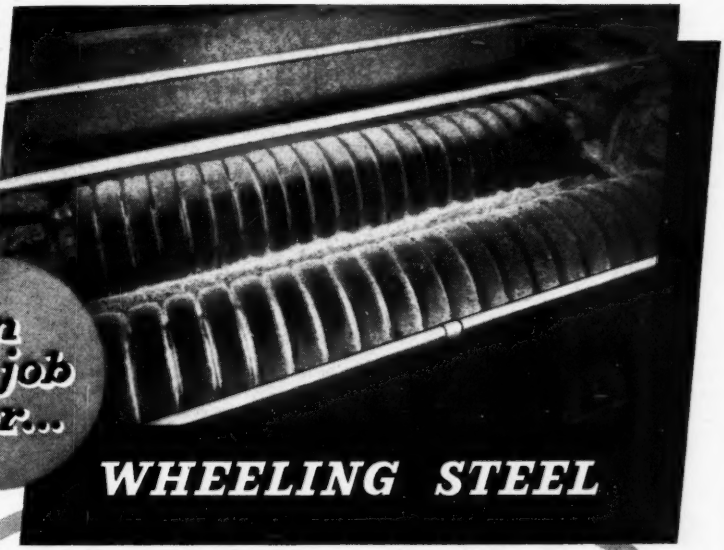
HOISTS

We have 500 electric, pneumatic and chain hoists on hand—used, but in excellent condition. Capacities to 10,000 lbs. Save up to 60% on these. *Write for our FREE illustrated WAR SURPLUS BARGAIN circular.*

ACME

Equipment Co., Inc.
126 S. Clinton Room 244
Chicago, Illinois

PITTSBURGH "Power Driven" BRUSHES



A "Pittsburgh" power-driven brush in operation at the Steelcrete Division of Wheeling Steel, Beach Bottom, W. Va. This special brush is on the job every day deburring and cleaning large sheets of Expanded Metal.

On the job for... WHEELING STEEL

Pittsburgh's ingenuity in designing special brushes for unusual jobs is sought time and time again by leading firms in almost every industry. Wheeling Steel, for example, recently put its brushing problem before Pittsburgh's staff of skilled brush engineers.

Selecting a .014 steel wire with pre-tested fast cutting qualities, Pittsburgh engineers designed and built a *Perfect Balance* rotary brush that could take a beating and come right back for more. The brush was *stiff* enough to remove stubborn burrs. It was *tough* enough to penetrate and thoroughly clean the metal. And it was *soft* enough not to impair surface texture.

The brush did the job right from the first day it was put into operation—another example of Pittsburgh's ability to cope with the most difficult brush problems.

There's a "Pittsburgh" Brush for Every Industrial Use!

- GLASS
- STEEL
- PLASTICS
- AUTOMOBILE
- RUBBER
- PAPER
- TIRE and RETREADING
- SHOE MANUFACTURING and REPAIRING

In the complete Pittsburgh line are brushes of all types, including "Perfect Balance" sections, wheels and assemblies. Consult the Pittsburgh engineering representative. He will gladly work with you in developing any type of power-driven brushes to meet your particular finishing specifications.

Phone or write Pittsburgh Plate Glass Company, Brush Division, 3221 Frederick Ave., Baltimore—29, Maryland

Power Driven BRUSHES

BRUSHES · PAINT · GLASS · CHEMICALS · PLASTICS

PITTSBURGH PLATE GLASS COMPANY

PRODUCT LITERATURE

The publications listed in this section may be obtained free upon written request on company letterhead to the manufacturers concerned. Your courtesy in mentioning PRODUCTS FINISHING when requesting copies of these publications will be sincerely appreciated by the manufacturer and the publisher of this magazine.

Oakite Service Report. Oakite Compositions No. 91 and 91-A for use in electrocleaning brass and other copper alloys before electroplating are fully explained, their advantages listed, and methods of use presented in a four-page service report available from Oakite Products, Inc., 20 Thames St., New York 6, New York.

B. F. Goodrich Pickling & Washing Machine Folder. A six-page folder which describes in detail the construction, operation, and advantages of its pickling and washing machine which prepares formed metal products for enameling, painting, or plating has been published by The B. F. Goodrich Co., Akron, Ohio.

Among features of the folder are a cu away illustration of the machine, wi descriptions of the most important par and the roles they play.

Presto Universal Back Stand Idlers a the subject of Bulletins 105 and 107 i sued by The Manderscheid Co., 810 Fulk St., Chicago 7, Ill. Operating characte istics, features, and specifications of t units are presented.

Bulletin L-1045 describing the Chrom lox Type ARTM Thermostatically-Co trolled Immersion Heater, its uses, co struction, ratings, and so on, is availab from the Edwin L. Wiegand Co., 7 Thomas Blvd., Pittsburgh 8, Pennsy vania.

Uni-Wash Dust Collectors are the su ject of an eight-page two color bullet published by the Newcomb-Detroit C 5749 Russell St., Detroit 11, Mich. Co plete specifications and ordering inform tion for both the "Junior" and "Senio models are presented.

CLEAN METAL

HOW? Where removal of oil is a factor and no additional steps in cleaning cycle are desired, we recommend Eskay Metal Cleaner. Its a new approach to an age old problem and really does the job. Further facts on request.

Stuart INDUSTRIAL SERVICE, INC.
166 W. Jackson Blvd. Chicago 4

McKeon's
Zinc-Brite
is a
TONIC and CONDITIONER
for your
ZINC SOLUTION.
FREE
SAMPLE and COOPERATION
Sulphur Products Co.
GREENSBURG, 6, PA.

WE SALUTE THESE

Salesmen of Security

The executives of the more than 20,000 companies that have sponsored the Payroll Savings Plan

The 7,500,000 workers who are each investing on the average of $20 per month in Savings Bonds

The employees who serve as volunteers selling U. S. Savings Bonds to their fellow employees

Here's a sales force that's helping to win economic peace of mind for the nation. These people have dealt heavy blows to inflation, fear, and doubt.

They are building security for themselves by buying Bonds. Every $3 they invest will pay $4 at maturity.

They are building security for their companies. As each Bondholder's own sense of security increases with his Bond purchases, he becomes a better worker. Plant morale improves. Production increases. Absenteeism, labor turnover, and the accident rate all decline. Relations between employer and employee improve.

They are building security for the nation. Savings Bond dollars are deferred purchasing power—an assurance of good business to come. The Treasury uses net Savings Bond dollars to fight inflationary credit potential in the banking system by retiring short-term bank-held Federal securities.

If your company isn't an active part of this sales force, better join now and get in on the benefits! Phone your State Director, Savings Bonds Division, U. S. Treasury Department.

The Treasury Department acknowledges with appreciation the publication of this message by

PRODUCTS FINISHING

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

4 x 5 3-4 in. Executive Papers

The Standard Electrical Tool Co., 2518 River Rd., Cincinnati 4, Ohio, has issued **Catalog No. 44** illustrating and describing its complete line of grinders, polishers, buffers, and speed lathes. Specifications of each machine and operating data are included.

Eclipse Pneumix Agitators. Types, dimensions, features, operating characteristics, and accessories are described and illustrated in a four-page bulletin distributed by the Eclipse Air Brush Co., 14th and Park Ave., Newark 7, New Jersey.

Detrick "Insuliner," a liner for breechings, flues, ducts, or any contour, and for protecting steel, is the subject of a four-page bulletin available from the M. E. Detrick Co., 111 W. Washington St., Chicago 2, Ill. Details of construction and instructions on estimating requirements are included.

Belco Bulletin 54. Belco Ion Exchangers with flow rates up to 2000 gallons per hour for demineralization of water, purification of liquids, treatment of industrial wastes, and recovery of valuable materials are the subject of Bulletin 54 published by the Belco Industrial Equipment Division, Inc., 102 Iowa Ave., Paterson 3, New Jersey.

"Work in Comfort with Chelsea Industrial & Commercial Fans" is the title of Catalog No. 864 available from Chelsea Fan and Blower Co., Inc., 1206 Grove St., Irvington 11, N. J. Fully described and illustrated are industrial fans, both belt driven and direct drive, complete penthouse units, paint spray booth fans and blowers and exhausters for many industrial applications.

Gardner Permanent Color Standards match many varnishes, oils, lacquers and resins, and Fluorescent Light Color Standards for liquids are illustrated and described in a leaflet released by Henry A. Gardner Laboratory, Inc., Bethesda 14, Maryland.

ALAKA Lacquers
QWIK-BAKE Synthetics
ALAKATONE Hammered Silver
SYNTHALAK Air-dried Synthetics
Custom Tailored Finishes TO FIT YOUR REQUIREMENTS
LACQUER & CHEMICAL CORPORATION
222 FORTIETH ST. BROOKLYN 32, N.Y.

WHY DID ONE COMPANY ORDER 15 OF THESE TANK MAGNETS . . . after trying one?

Model 17 (Illustrated) 19" Tank MAGNETOOL $36.00
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A large eastern plating dep't ordered 15—and many other platers large and small (names on request) have ordered and reordered—because the Rotary Tank MAGNETOOL grabs the parts and not the tank. It unloads instantly, completely. Acid and alkali proof. NO WIRES. Non-electric. Permanent. 100% guaranteed. Entirely new principle—patent pending. Order direct on 10 day trial or write for Bulletin.

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For a real good polishing job use
Keystone TURKISH Emery
FRESH SUPPLY AVAILABLE
KEYSTONE EMERY MILLS Write for Sample 4316 Paul St., Phila., Pa.

Continuous measurements of gloss and reflectance with the Hunter Gloss Exposure Head and ElectroniK Recorder, a photometric recorder designed by the Henry A. Gardner Laboratory for measuring reflectance, brightness, opacity and other appearance qualities, is illustrated and described in **Brown Instrumentation Data Sheet No. 10.10-1** available from The Brown Instrument Co., Wayne & Roberts Ave., Philadelphia 44, Pennsylvania.

"Setting Up Metal Polishing Wheels and Belts" is the title of a 44-page handbook obtainable from the Norton Co., Worcester 6, Mass., which contains many worthwhile tips for increasing production and cutting polishing costs. Illustrated throughout, the handbook discusses the following topics: Metal Polishing; Physical Properties Required in Abrasive Grain and Metal Polishing; Alundum Grain for Polishing; Preparation of Glue; Type of Polishing Wheels; Setting Up the Polishing Wheel; Cement As a Bonding Agent; Correct Drying; Setting Up Abrasive Belts; Factors of Efficient Polishing; Polishing Different Metals; and Alundum Grain Selection.

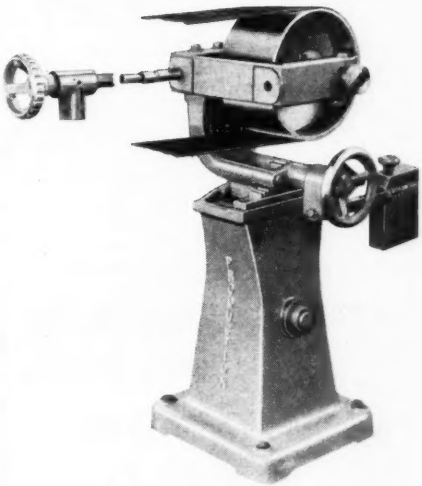
Korb-Pettit Spiral Woven Wire Conveyor Belts are the subject of Catalog No. 30, issued by Korb-Pettit Wire Fabrics & Iron Works, Inc., 1509 N. Mascher St., Philadelphia 22, Pa. The catalog includes many illustrations and specifications of right or left-hand conventional spiral weaves and herringbone type conveyor belts, which are available made of various metals in lengths and width desired and of the proper gauge wire for openings of $\frac{1}{32}$ to $2\frac{1}{4}$ inches.

"Hydrofluoric Acid Anhydrous" is the title of a 36-page two-color booklet obtainable from The Harshaw Chemical Company, Cleveland 6, Ohio. Well illustrated throughout, the booklet has been written to provide helpful data for those who now use HF or are considering its use. The contents are as follows: Accomplishments of Hydrofluoric Acid Anhydrous; Physical Properties; Materials of Construction; Types of Construction; Handling; Storage; Sampling and Analysis; Alkylation of Isoparaffins with Olefins; HF as a Condensing Agent; and HF as a Fluorinating Agent.

Production

New and IMPROVED

Back Stands



● Convert polishing and buffing lathes to the abrasive belt system. Adaptable for either right or left hand operation. Belts up to 6" wide and 14' long and contact wheels 6" to 16" diameter can be used.

Write for descriptive Bulletin PF-11

Production MACHINE COMPANY GREENFIELD MASSACHUSETTS U.S.A.

Wire Brush Folder. A four-page folder and price list describing and illustrating the Hewitt Rubberlokt Rotary Wire Brush is available from Hewitt Rubber Division, Hewitt-Robins Inc., Dept. PF-3, 240 Kensington Ave., Buffalo 5, New York.

"Rocheltex," a liquid addition agent which can be added to any cyanide copper plating solution for use in any type of equipment, is described in **Technical Data Sheet No. 5,** released by MacDermid Inc., Waterbury 88, Conn. A typical formula, operating conditions, and various applications of Rocheltex are presented.

Filt-R-Stil Demineralizers are the subject of a 26-page booklet issued by the Ion Exchange Products Dept., American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y. Designed to deliver the low-cost chemical equivalent of distilled water, the units are described in detail. Specification and performance charts are included, as well as many photographs and line drawings.

Mercil Type Plating Barrels are t subject of Bulletin PB-107 now availa from the Hanson-Van Winkle-Munni Co., Matawan, N. J. Two pages of sp cifications are included in the 18-pa bulletin, plus many photographs and d scriptions of models and accessories.

Columbia Motor-Generator Sets Electroplating Applications. Catal PF-700, published by the Columbia El tric Mfg., Co., 4535 Hamilton Ave., Cle land 14, Ohio, describes and illustrates Columbia line of electroplating gene tors and anodic treatment generato Details of construction and operati data are presented.

Cambridge Wire Baskets and Speci ties. The complete Cambridge line wire baskets, wire conveyor belts, m allic filter cloth, and other specialties described and well illustrated in a boo let published by the Cambridge Wi Cloth Co., Dept. A, Cambridge 2, Mar land.

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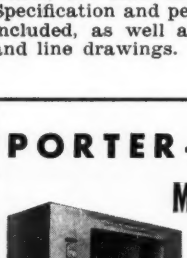

Completely hydraulic, dirt protected, with infinitely variable combinations of vertical and cross strokes. For glazing, polishing, and coloring all types of flat pieces: skates, scissors, saw frames, wrenches, putty knives, knife blades, etc., up to 14" long.

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We RECOVER YOUR **SOLVENTS and THINNERS**

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Testing Equipment for Organic Coatings

ASTM Viscosity Cups, Conical Mandrel AST D522-41, Abrasiometer ASTM D658-44, Scra Adhesion & Mar Tester (Laboratory & Pocket typ Automatic Spraying Machine D825-45T, Bell Te Lab. Impact Tester, Dust Free Tester (drying tim

Write for illustrated literature.

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187 Lafayette St., N.Y.C., 13

"Cut Labor Costs ½ or More" is the title of a bulletin obtainable from Almco, Division of Queen Stove Works, Inc., Albert Lea, Minn., which presents the complete line of "Supersheen" deburring and finishing barrels, auxiliary equipment, supplies, and compounds.

Wet-or-Dry Peerless Surfacing Machine with 9, 14, or 20-inch belts is illustrated and described in **Bulletin PF-10,** obtainable from the Production Machine Co., Greenfield, Mass. A cutaway view illustrates construction features of the machine and a page of specifications is included.

"The Story of Freedom-Valvoline Rust Preventive Compounds" is the title of a 4-page booklet published by the Freedom-Valvoline Oil Co., Freedom, Pa. Intended to convey general information on rust preventive compounds and their applications, the booklet groups compounds into four parts, as follows: (1) thin film type, solvent cut-back cold application; (2) rust-inhibited, cold application; (3) waxy type, hot application; and (4) concentrates.

DeVilbiss "V" Type 4-Cylinder Air Compressor is the subject of Form CK-101, available from The DeVilbiss Co., Toeldo 1, Ohio. Features of the compressor and its specifications, together with illustrations, are included.

Hercules CMC. Considerable new information on the physical properties of Hercules CMC, cellulose gum, is included in the revised 12-page technical booklet released by the Hercules Powder Co., 927 Market St., Wilmington, Delaware.

"Specification Index for Bristol Instruments" is the title of a 24-page bulletin published by The Bristol Co., 108 Bristol Rd., Waterbury 91, Conn. Designated as the No. W1800, the bulletin contains illustrated data on the Bristol line of automatic controlling, recording, and indicating instruments. Specifications are provided for each instrument listed, and the bulletin is well illustrated with line drawings which show basic methods of employing various types of industrial instruments.

A Strippable Plastic for the Protection of Metals

Striplastic is a protective plastic applied by spraying, dipping or rolling. It is used on stainless steels, high polished metal sheets, sheets in cold working or drawing, tools, dies and parts, and on sheets or metal parts before packaging. It protects against scratching and abrasion, and against rust. Also available as a booth coat protection.

THE STRIPLASTIC COMPANY

Among many advantages, it is nontoxic, possesses great tensile strength and is easily stripped off in one piece. Write for complete information on this new strippable plastic.

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The Finishing Touch — **By J. A. Patterson**

"McNamara's kid brings it — I hook it on and it reaches McNamara about lunch time!"

Opportunity Section

SALESMAN

Situation open—old established manufacturer of plating and polishing equipment and supplies desires salesmen for Chicago and Midwestern territories. Prefer men with some mechanical and plating knowledge. Industrial selling experience required. Excellent opportunity. Write fully, giving age, nationality and educational and business details. Box No. 41, c/o Products Finishing, 431 Main St., Cincinnati 2, Ohio.

FOR SALE: 2 Hammond 10 HP buffing lathes, brand new, never used, double spindle, heavy duty, 220V, 3 phase, push button, complete with controls. ALSO: 1 Divine 6 unit type, straight line automatic polishing and buffing machine, including 6-7½ HP units, with conveyor, drive, belt, and all motors, starters and applicators, 220V, 3 phase, 60 cycle, USED. Write Box No. 44, c/o PRODUCTS FINISHING. 431 Main Street, Cincinnati 2, Ohio.

FOR SALE: 3 Water Wash Spray Booths 16 ft. each complete with two 7½ HP Exhaust Units and 800 GPM 7½ HP Pump priced at less than half original cost, approximately two years old. 4 Compressors two 30 CFM, Two 40 CFM equipped with motors and tanks excellent condition. One Gas Oven work area 4' x 8' x 22', recirculating type, automatic controls, 0 to 400 degrees, excellent condition. 3 Infra Red Ovens conveyor type 30' long. Write Box No. 42, care Products Finishing, 431 Main St., Cincinnati 2, Ohio.

FOR SALE: 2,500 Safety Needle Point Tampico wheels. Never used, excellent for satinizing work on metal. 12" diameter, 1¼" hole, 20% off present market price. Ford Metal Moulding Co., 27-01 Bridge Plaza N., Long Island City, N. Y.

G. S. BLAKESLEE TRICHLORETHYLENE DEGREASER FOR SALE

Vapor type, heated by two 10 horsepower steam boilers with low pressure natural gas, cleaning capacity 1,500 lbs. of metal per hour, for conveyor operation, complete with 30 gallon still, opening for work 36" wide x 72" long, length 43', complete with recirculating pumps, solvent regenerating system. This machine purchased new from G. S. Blakeslee Company in 1946 and is now in operation, ready for immediate shipment and use. Reason for selling, changing type of cleaning operation. For full details call, wire, or write:

BRYANT HEATER
Division, Affiliated Gas Equipment, Inc.
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FLUORESCENT REFLECTORS

Vapor proof, DeVilbiss type LF 501, two lamp (40 watt) type, 70 available, never used. Original price $80.00 each, will sacrifice at $40.00 each.

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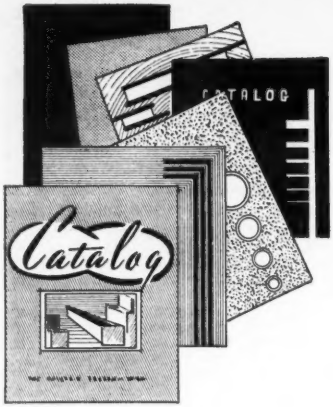
3301 Broadway **Cleveland, Ohio**

We have available for installation at our plant a complete full automatic Stevens barrel plating unit capable of producing plated finishes in large volume. Our facilities are also available for stamping and fabricating small parts requiring barrel plated finishes. If your product is such that stamping, fabricating and plating is required, it can all be done economically at our plant.

Bring your plating and finishing problems to us. We will do our best to assist you.

ROYAL PLATING & POLISHING CO., Inc.
152-58 Bleeker St., Newark 4, N. J.



Catalogs

FOR YOUR LIBRARY

To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.

1. Rack Coating

A four-page bulletin prepared by United Chromium, Inc., New York 17, N. Y., describes Unichrome Coating 218.

2. Precious Metal Plating

A 16-page booklet issued by A. Robinson & Son, New York 2, N. Y., presents in usable form accepted methods applied in the electroplating of such articles as watch cases, insignia, jewelry, novelties, pen and pencil parts.

3. Polishing Accessories

The Manderscheid Co., Chicago 7, Ill., has issued Bulletin 103 describing the Presto line of work holding spinners, tube polishing machines, emery troughs, wheel rakes, and other polishing room accessories.

4. Dust Collectors

Designated as the No. 31, a 24-page catalog illustrative and descriptive of its line of dust collectors and allied equipment for carrying away dust-laden air around grinding, cutting, and polishing wheels is now being distributed by the Torit Manufacturing Co., St. Paul 2, Minnesota.

5. Copper Anodes

A folder describing "Flat-Top" copper anodes may be obtained from Wagner Brothers Inc., Detroit 3, Michigan.

6. Strippable Plastic

Technical Data Bulletin No. T504, describing Copeel Strippable Plastic Coating, is being issued by the Maas & Waldstein Co., Newark 4, New Jersey.

7. Industrial Chemicals

A bulletin issued by the Harshaw Chemicals Co., Cleveland 6, Ohio, lists alphabetically the chemicals supplied by the company. Specific listings of chemicals supplied to industries such as electroplating, ceramics, scientific laboratories, and so on, are included.

8. Tumbling

"Precision Tumbling with Alundum Abrasives" is the title of a booklet of interest to finishers of metal or plast parts which is now being offered by th Norton Co., Worcester 6, Massachusett

9. Engineered Finishing Systems

A catalog and handbook of engineeri data describing engineered systems f paint finishing, dust collecting, air ha dling, and materials handling manufa tured by the company is being supplie by the Newcomb-Detroit Co., Detroit 1 Michigan.

10 Polishing and Deburring Machinery

Hammond Machinery Builders, Inc Kalamazoo 54, Mich., has issued Catalo No. 325 describing the flexible abrasiv belt grinder-polishers, abrasive be grinders, polishing and buffing lathe wheel heads, backstands, and other ma chinery manufactured by the company.

11. Free Silica in Dusts

"A Study of Free Silica in Dusts Com mon to the Porcelain Industry," is th subject of Technical Bulletin No. 7 issue by the Ferro Enamel Corp., Cleveland Ohio, which provides data and dust con trol methods of value and interest t safety engineers.

12. Spray Finishing Equipment

Catalog No. 97 prepared by the Bin Manufacturing Co., Chicago 12, Ill., con tains complete data on spray guns, spra booths, air compressors, painting outfit extractors, respirators, hose, and othe products.

13. Conveyor Belts and Wire Baskets

The complete Cambridge line of wir baskets, wire conveyor belts, metall filter cloth, and other specialties is de scribed in a booklet published by th Cambridge Wire Cloth Co., Dept. A, Cam bridge 2, Maryland.

14. Cleaning Machinery

An illustrated folder descriptive of it complete line of machinery for washing rinsing, and drying metal parts is no being offered by the Cincinnati Cleanin and Finishing Machinery Co., Ironton Ohio.

15. Metal Degreasing

The Chlorine Products Division, Electrochemicals Dept., E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del., has issued a 10-page illustrated booklet outlining standard practices for degreasing metals with chlorinated solvents.

16. Nickel Plating

"Practical Nickel Plating" is the title of a comprehensive booklet issued by the International Nickel Co., New York 5, N. Y., which contains a summary of information on industrial nickel plating, including solution compositions, operating conditions, process cycles, cause and correction of plating difficulties, and solution purification methods.

17. Flock

The Behr-Manning Corp., Troy, N. Y., is now offering a color guide and information booklet on rayon precision-cut flock for application to metal, wood, glass, plastic, cloth, or paper.

18. Spar Varnish

Standard Varnish Works, 2600 Richmond Terrace, Staten Island, N. Y., is offering a booklet describing "1000 Spar" Varnish.

19. Abrasive Grains

The Exolon Co., Tonawanda, N. Y., has issued a folder describing Exolon abrasive grains and polishing procedures applicable to various industry groups.

20. Metal Preparation

The Neilson Chemical Co., Detroit 7, Mich., has issued the following bulletins describing Neilson pre-paint treatments: Alumiprep, a surface treatment for aluminum; Prep-n-Cote, a cleaning and phosphate coating for steel or aluminum to be used in spray washing machines; Metalprep, a rust remover and metal cleaner for steel, aluminum, or galvanized iron.

21. Organic Finishing

A 12-page technical bulletin outlining basic points to be considered in the planning of a complete organic finishing system has been prepared by Peters-Dalton, Inc., Detroit 12, Mich.

22. Cleaners and Paint Strippers

Six technical bulletins describing paint strippers, cleaners, and phosphate coating materials are being distributed by Chemco Products Co., Inc., Chicago 19, Illinois.

23. A.C. Generators

A bulletin describing the construction and operation of Columbia alternating current generators is being issued by the Columbia Electric Manufacturing Co., Cleveland 14, Ohio.

24. Clear Lacquer

Stanley No. 45X-70 Clear Gloss Synthetic, a water-white coating for silver, or brass, chromium, steel, iron, magnesium, and zinc, is described in a data sheet available from The Stanley Chemical Co., East Berlin, Connecticut.

25. Abrasive Belt Head

Bulletin No. 17 issued by The Packer Machine Co., Meriden, Conn., describes Model No. 18 universal abrasive belt head and contains suggested applications of the device.

26. Stripper

"Stripping with Magnus Stripit" is the title of Bulletin 41 issued by the Magnus Chemical Co., Inc., Garwood, N. J., which describes the removal of various finishes with Magnus Stripit and outlines suggested stripping methods.

27. Dust Collectors

A catalog describing types and models of Air Tumbler dust collectors and suppressors has been issued by the Dust Suppression & Engineering Co., Lake Orion, Mich. The action of the Air Tumblers in removing dust is described and data on unit size and capacity are included.

28. Cabinet Ovens

The Young Brothers Co., Detroit 7, Mich., has available Bulletin 8-S presenting information on electric, gas, or steam heated laboratory, standard, and special cabinet ovens.

PRODUCTS FINISHING
431 Main St., Cincinnati 2, Ohio

I am interested in receiving the following literature reviewed in your April issue.

No..... No..... No..... No..... No.....
(Insert numbers denoting literature you want)

Name ..... Title .....

Company .....

Company Address .....

City ..... State .....

Print plainly in filling out coupon for literature.

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